OUR INDIA

WITH 100 ILLUSTRATIONS

BY MINOO MASANI

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Illustrated by

C. H. G. MOORHOUSE

INDIAN BRANCH

Humphrey Milford

OXFORD UNIVERSITY PRESS

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AMEN HOUSE, LONDON, E.C.4
EDINBURGH GLASGOW NEW YORK
TORONTO MELBOURNE CAPETOWN
BOMBAY CALCUTTA MADRAS
HUMPHREY MILFORD
PUBLISHER TO THE
UNIVERSITY

First published, October 1940
First cheap edition, November 1940
Reprinted, January 1941

PRINTED IN SCOTCH BOLD TYPE
BY K. C. BANERJEE AT THE MODERN ART PRESS, CALCUTTA
BOUND BY HARTSON & CO., CALCUTTA

PAPER MANUFACTURED IN CALCUTTA AT TITAGHUR PAPER MILLS
FROM BAMBOOS GROWN IN ORISSA

PREFACE

A little knowledge, it is said, is a dangerous thing. Statistics of Indian life are so scanty and scrappy that reliance on them is bound to endanger one's conclusions. A little book of this nature does not, fortunately, have to pretend to scientific accuracy. Nor can it be burdened with footnotes giving references to works from which facts and figures were derived. That makes it all the more necessary, however, to acknowledge the author's indebtedness to various sources from which he has drawn much of his material. Such a list can hardly be complete, but among the works which he would like to mention are Jathar and Beri's *Indian Economics*,[1] Arnold Lupton's *Happy India*,[2] Soni's *Indian Industry and its Problems*,[3] Gyan Chand's *India's Teeming Millions*,[2] V. K. R. V. Rao's *India's National Income*,[2] Wadia's *Geology of India*,[4] Ram Manohar Lohia's *India in Figures*,[5] H. G. Wells' *Work, Wealth and Happiness of Mankind*,[6] Otto Neurath's *Modern Man in the Making*,[7] and the *Statistical Year Book of the League of Nations*.[2]

The verses on pages 54, 62 and 67 have been quoted from Shamrao and Elwin's *Songs of the Forest*,[2] Ilin's *Moscow Has a Plan*,[8] and Mrs E. M. Milford's translation of Jasimuddin's *The Field of the Embroidered Quilt*.[1]

I am indebted to many friends for suggestions, particularly to Professor M. L. Dantwala of the New Commerce College, Ahmedabad, Mr J. C. Kumarappa, Secretary of the All India Village Industries Association, Dr Nazir Ahmed, Director of the Indian Cotton Technological Institute, Professor F. R. Bharucha

[1] Oxford University Press. [2] Allen & Unwin. [3] Longmans Green. [4] Macmillan. [5] U. P. Provincial Congress Committee, Lucknow. [6] Heinemann. [7] Secker & Warburg. [8] Cape.

of the Royal Institute of Science, Bombay, Mr S. S. Zubair of the Tata Hydro-Electric Power Company, Ltd., and Mr P. B. Karanjia of the Bombay Suburban Electric Supply Company, Ltd. To Mrs Sarojini Naidu, I owe a special debt for her encouragement and interest.

Thanks are also due to the Secretary of the National Planning Committee for permission to peruse reports and drafts of various sub-committees.

M. M.

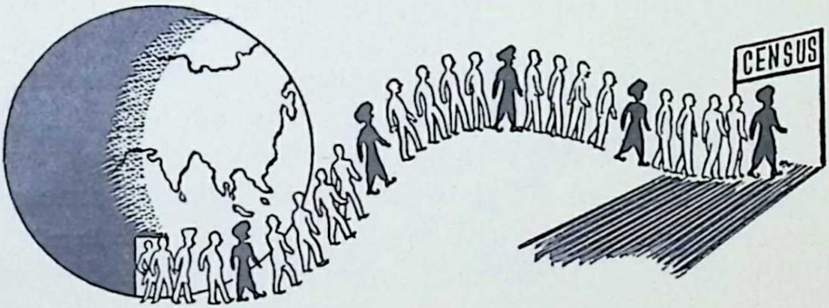
Bombay, September 1940

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I

ONE IN FIVE

One man in every five is an Indian. The other four are, let's say, an American, a European, a Negro and a Chinese. Here they are being counted.



Doesn't that make you feel very important? It is rather a staggering thought, isn't it, that we Indians are no less than a fifth of the human race and that, next to China, our country has the biggest population in the world? And doesn't it make us feel keen to take our proper share in the ordering and settling of the world's affairs?

Besides, what a huge country ours is! Extending 2,000 miles east to west and 2,000 miles north to south and with an area of some 2 million square miles, it is as big as the whole of the continent of

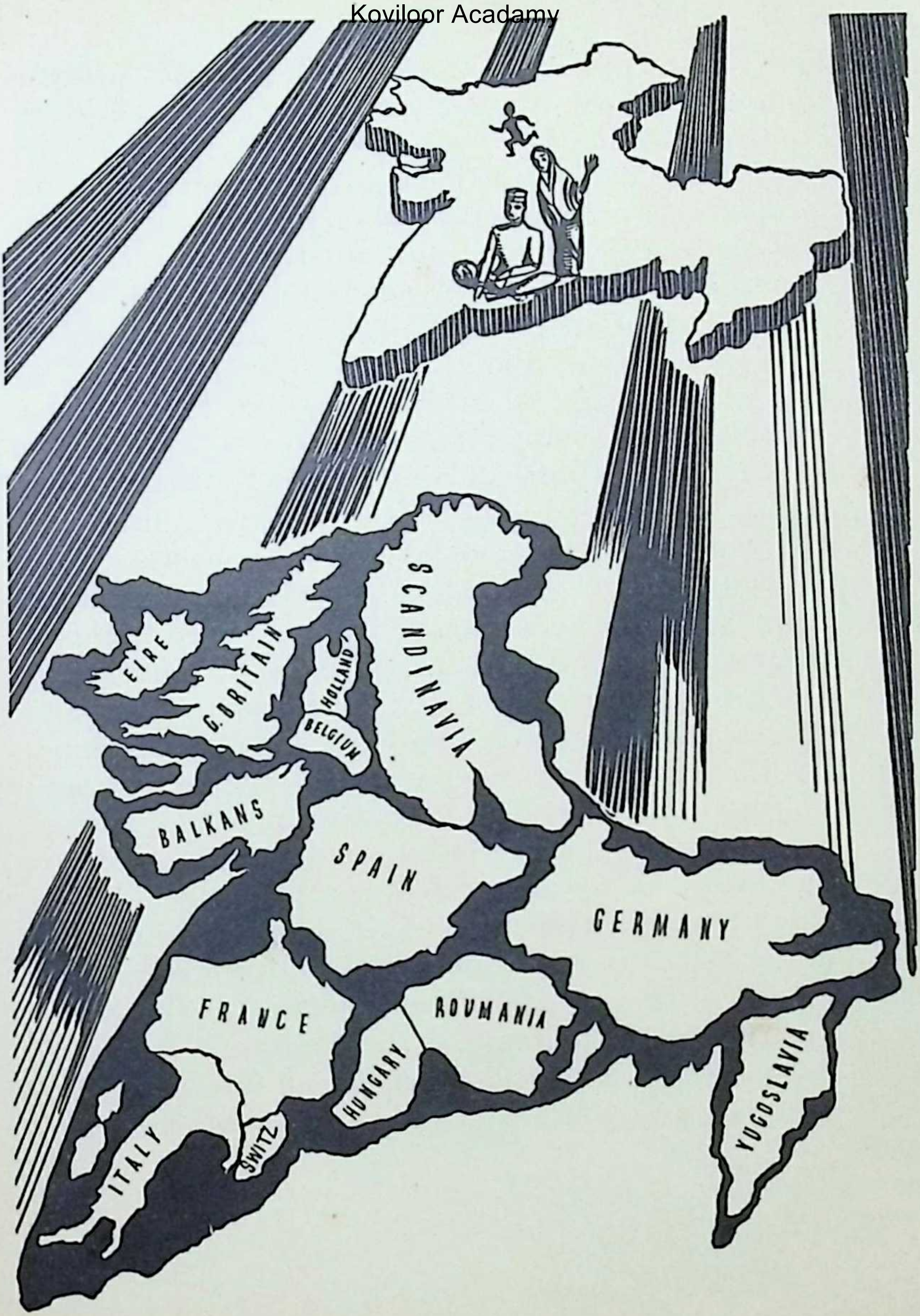
Europe excluding Russia, as you can see from the map opposite.

The size of an ordinary district in India is 4,000 square miles, and some of our districts are as big as entire States in Europe. Thus, both the area and population of Vizagapatam district in Madras are bigger than those of Denmark, Mymensingh district in Bengal contains more people than Switzerland, and there are far more living in the Tirhut division of Bihar than there are in the 'great' Dominion of Canada!

We should remind ourselves of this because many tiny little countries occupy such a lot of room in our history books and in our newspapers and receive such a lot of attention. Even some of the maps of the world in your school atlas—not deliberately, of course!—give this lop-sided view of our place on the globe. Do you know that one of them actually makes India look only *half* as big as it really is compared to England?

Now, size or bigness is not in itself much good. It is what one makes of one's bigness that matters. It has its advantages and its disadvantages. It faces us with big difficulties and big problems. But it makes it possible for us to do things in a big way.

We Indians are like a landlord with a big estate, but we have to ask ourselves where and how it is situated. Is it provided with well-marked boundaries to distinguish it from neighbouring estates or

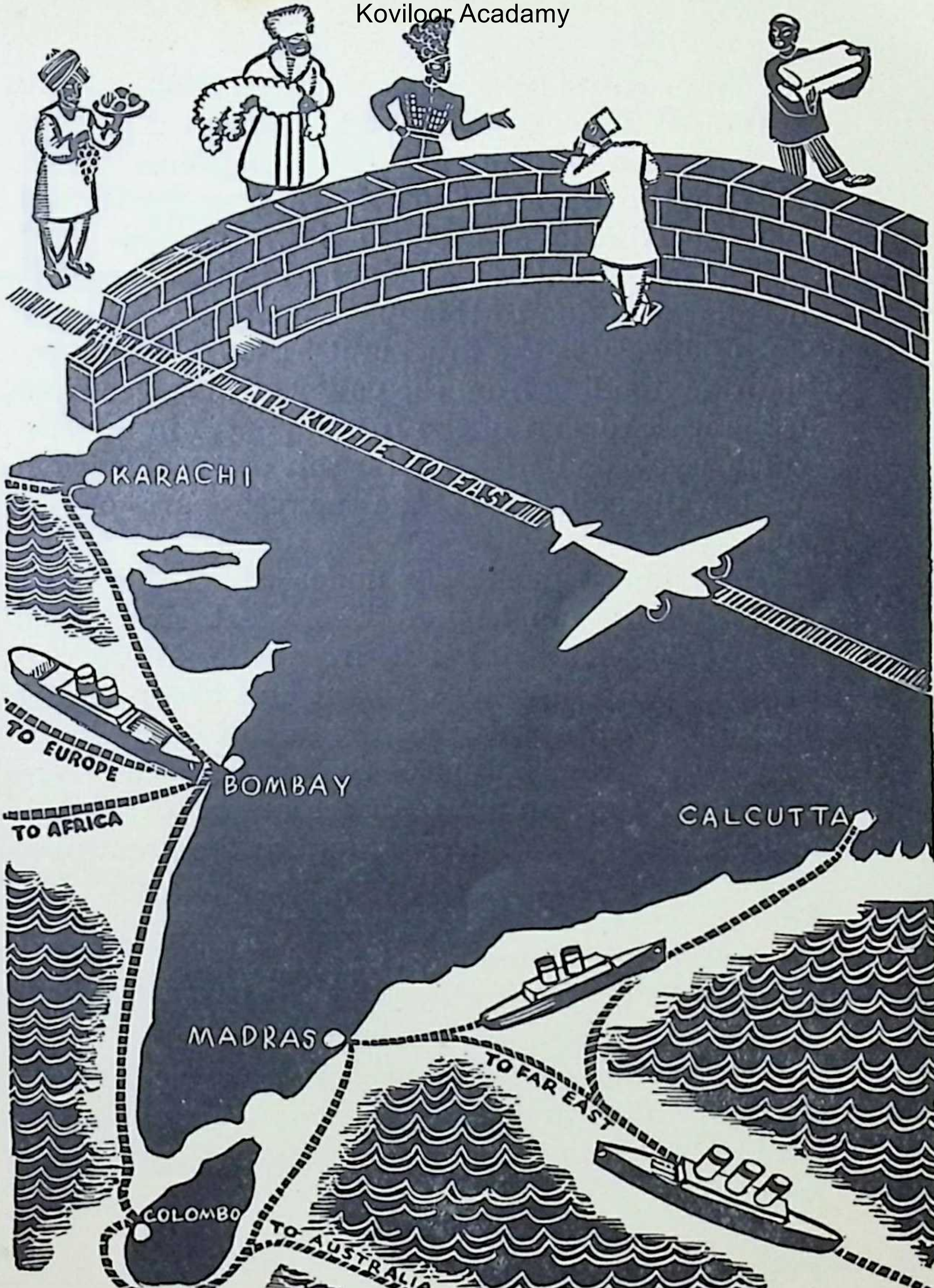

EIRE
G. BRITAIN
HOLLAND
BELGIUM
SCANDINAVIA
BALKANS
SPAIN
GERMANY
FRANCE
ROUMANIA
HUNGARY
YUGOSLAVIA
ITALY
SWITZ

not? Is it placed on the main road or is it in some remote corner approachable only through dark and winding lanes?

Nature has provided India with more shelter and protection through natural boundaries than almost any other big country. A broad expanse of deep blue ocean surrounds it on east, south and west. And on the north, could there be a more impregnable Siegfried Line than that provided by the Himalayan range of mountains which runs almost all the way along our land frontiers?

Although we are so well marked out and sheltered, we are by no means cut off from the rest of the world. On the contrary, we are situated right on Nature's highway. India is placed on important shipping and trade routes from Europe and the Near East to the Far East and to Australasia. It can trade with equal ease with China, Japan, Thailand (Siam) and Malay, with Australia and New Zealand, with East and South Africa, with the Levant and Europe and with Russia, Iran, Iraq and Afghanistan.

Turning our attention inwards, what lies inside our frontiers, what sort of country is ours? Those who study the structure of the land and what lies under it tell us that India divides itself into three rather distinct parts. There is first in the South the triangular plateau of the Peninsula, which is the oldest part of India and which is rocky. The Vindhya and the Satpura mountain ranges rising


AIR ROUTE TO EAST
KARACHI
TO EUROPE
BOMBAY
TO AFRICA
CALCUTTA
MADRAS
TO FAR EAST
COLOMBO
TO AUSTRALIA

east from Kathiawar mark this part from the rest of India. Then in the North there is the mountainous region of the Himalayas, the tallest mountains in the world. Some learned people believe that the Himalayas are still slowly rising! They say the earthquakes we have had in this region, as in Bihar, are due to this movement.

In between is the third unit—the Indo-Gangetic Plain—extending from the valley of the river Indus in the west to that of the Brahmaputra in the east, which is blessed with fertile soil of great agricultural value. This is the newest part of our country.

For a long time it lay under the sea, and the Peninsula was an island. The great rivers from the North scraped earth from the Himalayas, rushed down the valleys with it and dropped their mud in the calm waters of the inland sea. Slowly, very slowly, the bottom of the sea rose, the rivers had to carry their mud farther before they could find a quiet place to drop it, and so the great plain of the Indus and the Ganges was built up. The Peninsula was no longer an island. The gap was filled. The Peninsula of Southern India was joined to the hills of Asia by the plain of Hindustan, one of the most fertile regions in the world.

The Himalayas influence our country a great deal. For one thing, they affect our climate and our land. By keeping off the dry winds of Central Asia,

they protect India from the desert conditions which prevail there and which would otherwise spread south. Thanks to these friendly mountains, India's climate is so pleasant that an Englishman described it as delightful in *all* parts of the country for *some* months of the year and in *some* parts of the country *all* the year round.

Another thing, where do the great rivers of India spring from? Again, the Himalayas! On their slopes lie the sources of the Indus, the Ganges and the Brahmaputra, which provide the people of Northern India with water, irrigate the soil and provide a means of transport. Also, they are still dropping mud on the land and making it more fertile.

To keep these big rivers flowing endlessly from mountain to sea, Nature has devised for us something as marvellous as the jinn that could be conjured up by Aladdin's Lamp. This jinn is our familiar friend, the Monsoon. In the middle of each year, he transports, as you can see in the picture on the next page—through the action of the sun, the clouds, the wind and the rain—indescribable quantities of water back from the sea to the mountain tops. He also waters the parched plains of India.

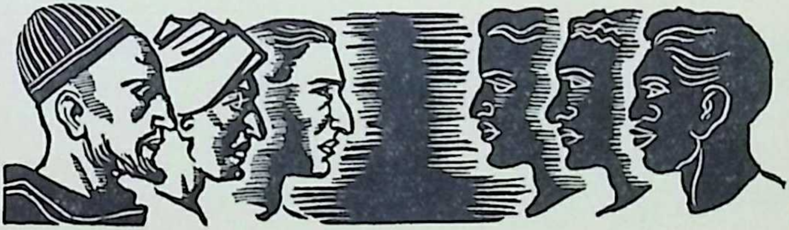
Next to the Monsoon, perhaps the most striking thing about India is the tremendous variety of its climate, its land and its people. No wonder, for Cape Comorin is only 8° north of the Equator and



Gilgit in Kashmir is 34° north. India has every variety of climate from the blazing heat of the plains as hot in places as hottest Africa—Jacobabad in Sind can be in summer as much as 125° in the shade—down to below freezing-point, to the Arctic cold of the Himalayan region. While Cherrapunji in the Assam hills has 460 inches of rain in the year,

Upper Sind has about 3 inches only. In general, we have eight completely dry months followed by four months of a continual downpour of rain. We have the fertile Indo-Gangetic plain in which almost anything will grow, and the rich tropical forests along the coast of the Peninsula, as in Malabar; but we also have the dry, sandy desert regions of Rajputana and Sind and Cutch.

How often we just look at a man and say, 'I don't like his looks!' or 'He must be a nice chap'. Why? Because instinctively we feel that a person with such a face cannot be nice or that another man with a certain expression in his eyes must be exceedingly nice. And indeed, our instinct is often right—though sometimes we make a wrong guess—because what a man is like is generally to be seen from his face and his expression. Now, the land and the mountains and the rivers and the climate of a country are its face, while its men and women are its mind and soul. Only, in this case, because the people arrived so long after the country took its present shape and form, the process is reversed and the face of India is reflected in its mind and soul.



It is only natural therefore that the wide variety in its physical features should be found repeated in the people who live in India. The Indian can be as fair as the blondest of Hitler's Nordics, he can be as dark as the African negro.

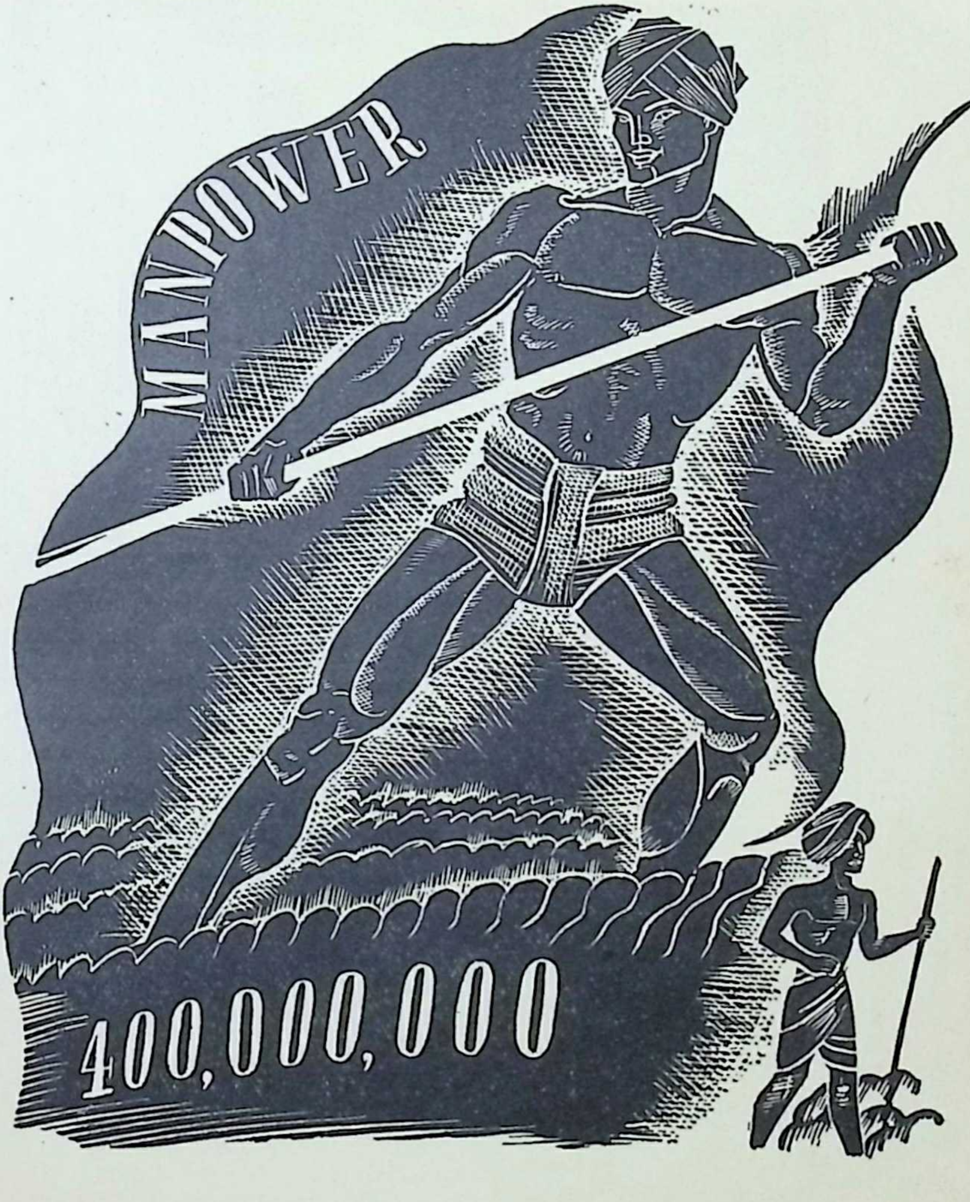


He can be the tallest of men, he can be as short and squat as an Australian bushman. He can be stalwart and strong, he can be frail and rickety. He can be like *this* picture or like *that*. Even in 1940, you can find him living, both in his mode of existence and in his way of thinking, in every century from the fifth to the twentieth. Perhaps nowhere in the world, except in Soviet Russia, can we find such a variety of human types as in India.



And what tremendous man-power its huge population of nearly 40 crores (or 400 millions) gives to India—next to China, the biggest in the world.

The fact that there are so many of us and such different kinds of us may, and does, produce rather difficult problems for us to solve in the way of living together peacefully and happily. On the other hand, just think what a tremendous source of strength it is and can be!


MANPOWER
400,000,000



A lot of the progress men have made in supplying themselves with food, clothes, houses and other things they need, is due to increasing division of labour amongst themselves. Your father doesn't grow everything he eats, and make with his own hands everything he uses, does he? No. Very wisely he takes advantage of the greater experience of the peasant in growing corn and rice and of the greater skill of those who make his clothes and his shoes and his shaving-razor and his books for him. If he tried to do everything for himself with his own hands, he wouldn't get very far for all his cleverness (hush, fathers are *always* clever!), would he? No, none of us—not even the strongest and the cleverest

—can possibly find the time or the energy to learn to make all or even a twentieth of the things we need for our use every day. So, learning wisdom through the ages, we have divided the work among ourselves, some of us in the fields growing wheat and rice and vegetables and fruits to eat, others in the factories making cloth and shoes and motor-cars and radio-sets, with yet others sitting at tables and writing books. So far has this process gone nowadays that a small thing like a piece of clothing may be the work of scores of workers specializing in one of numerous processes like growing cotton, ginning it, pressing it, carding it, spinning yarn out of the cotton, weaving cloth out of the yarn and making something to wear out of the cloth.

Different people are clever at different kinds of work. So too, different races or types of men display qualities of mind and body which fit or unfit them for particular kinds of work.

Similarly, different kinds of land can produce different crops and different kinds of climate are, according to their heat or cold, dampness or dryness, fitted or unfitted for particular processes of cultivation or manufacture.

Just think how lucky a country like India is—and how rich it ought to be—which has all types of men, all sorts of land and all kinds of climate!

It means that India is a country which has, somewhere or other, all the possible raw materials

for making all the things its people want. It means that we Indians can grow or make in India almost anything we require. Can you imagine, for instance, cotton being grown in England or apples in Arabia? But in India we can have *swadeshi* cotton AND *swadeshi* apples.

II

CAN YOU EAT THE SUN ?

The great English poet Milton speaks in *Paradise Lost*, the greatest piece of poetry he wrote, of 'the wealth of Ormus and of Ind'. Indeed, the wealth of India was proverbial in times long past.

It was tales of gold and silver, diamonds and rubies, silks and brocades, musk and camphor that fired the imagination of distant peoples and made them covet the riches of India. If you were to ask me, however, what India's most precious possessions have been or are, I would not point to the gold in the vaults of the Nizam of Hyderabad nor to the bank-balances of our millionaires who own factories and shops nor to the palaces of the princes and mansions of the rich, but to the sun and to the land and the rivers and the rains and the mountains of our great country and, above all, to those crores upon crores of men, women and children who live in it.

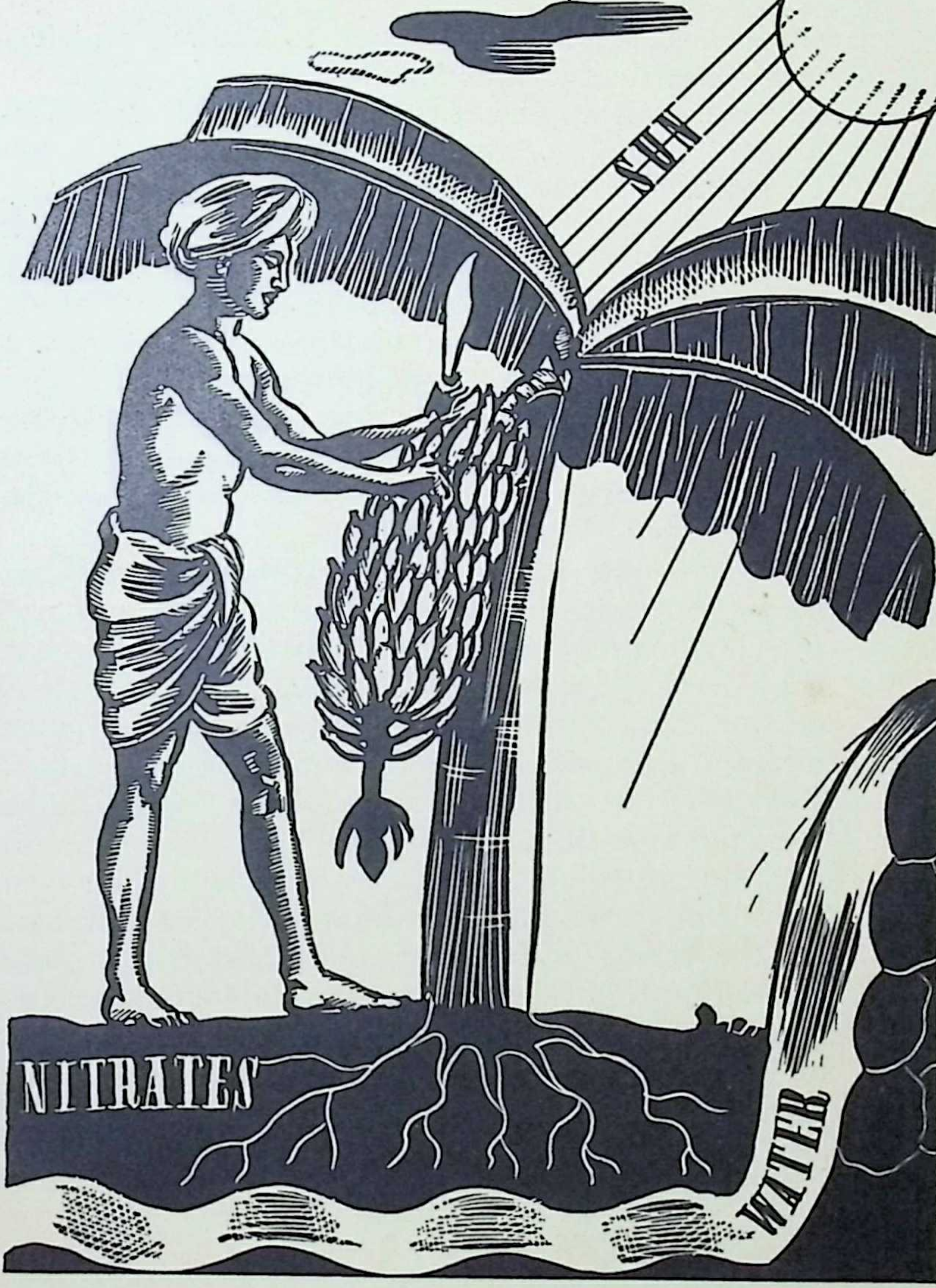
Perhaps like good, practical, matter-of-fact young people of the twentieth century, you will jib at this. 'You can't eat the sun or drink the rivers or live on the mountains!' you will exclaim. Can't you, though? And are you so sure you don't? I don't mean literally—though some wise and saintly

people do that too, almost! But quite seriously, doesn't every one of us get what he eats and drinks and what he wears and what he lives in from precisely these elemental things?

Take, for instance, the green vegetables you eat —what are they but the sun's rays, earth, water and air? Water is the biggest part of all vegetables, and from the air they take a gas called carbon dioxide and from the soil salts called nitrates. These are the most important things in all vegetable matter. The energy which transforms these things into food comes from the light and heat of the sun. Do you know, for instance, that the cabbage you eat is 91·5 per cent water?

These are just examples. They should make you think and warn you not to be taken in if some teacher at school happens to tell you that the wealth of the country lies in its banks. You just tell yourself you know better, remind yourself that India has sufficient sun and rain for raising two crops in the year in almost *all* districts and three crops in *some* of them—and smile in a mysterious and superior manner!

Let us now make a little catalogue of our country's riches—not by any means a complete one. Big fat books have been written by learned old professors in an attempt to prepare such a catalogue, but still they are never really complete. So just let us pick out a few items to give us an idea how rich we are,


SUN
NITRATES
WATER

since most of us don't happen to know it and feel unnecessarily sad and forlorn.

What shall we put at the head of our list of valuables? I suggest we don't be modest and put—OURSELVES. A great thinker and lover of humanity, an Englishman named Ruskin—whose little book *Sesame and Lilies* you will perhaps read at school or college—was never tired of insisting that happy, healthy people are the most valuable things a country can possess. And he was right.

Think what tremendous strength and energy to make and to move things, what great power—Man-power—its huge population of 40 crores gives to India.

Of its people, it can be said without fear of being accused of boasting that, all in all, they are not inferior in intelligence to any other race and that they have a glorious civilization and an ancient culture behind them. The hot climate no doubt makes for physical slackness and lessens efficiency. But there have been occasions when Indians have been put to work alongside people of other races on a footing of equality and they have held their own very well. This has been happening, for instance, on the farms and orchards of California in the United States of America and in the logging camps and lumber mills of Oregon and Washington and of British Columbia in Canada. There Indians have proved themselves as efficient at work as

Americans, Canadians, Mexicans, Chinese and Japanese. And, as we have already seen, along with quality we have infinite variety.

Let us place second on our list those who, like us, are live creatures—our ANIMALS. Of these we have all kinds from the elephant down to the snake and the mosquito. Cattle are the most serviceable of the lot and of these it is estimated we have 180 million, a third of the whole world's stock. Of sheep and goats we have some 87 million, which is a seventh of the world total.

Third, let us list the SUN. 'But every country has the sun,' I hear some of you protesting. But is that so? How much of it, and for how long? No, the sun is undoubtedly a particular asset of ours. I know some of us think we have too much of the sun in India. It certainly makes us feel hot and bothered—and thirsty. On the other hand, just think of all it does for us. Its strong rays are ever at our disposal, injecting energy and life into our bodies, making things grow on our soil, pumping the water of the Indian Ocean up into the clouds for the monsoon to deposit on the Himalayas and to shower over our countryside, drying up our drains and swamps of stagnant water, and killing many harmful germs. It was not for nothing, you see, that the people of the tropics, whether Hindus or Iranians, have worshipped the sun and bowed before it in the *surya namaskar*.

The MONSOON, to which our peasants look so anxiously to water their land, is our fourth great asset. As we have seen, it also carries the water back from the sea to the mountain tops and helps the rivers to keep flowing.

Our MOUNTAINS—the Himalayas and the lesser giants—are the next item in our catalogue. They shelter us from attack by other people and from the hot, dry wind of Central Asia which would dry up our vegetation and reduce Northern India to a desert. They are natural reservoirs of water which send down into the plains rivers and waterfalls. For the sick and the tired, they are the sanatoria and the holiday places Nature has provided, to which to escape from the plains.

Then come our RIVERS. They water our land—and land can get as parched and thirsty as you or I. Besides, flowing water, as we shall see a little later, is a great source of energy which we capture and cage in a wire and call Electricity. Our water-power resources are, next to those of Canada and the United States of America, the best in the world.

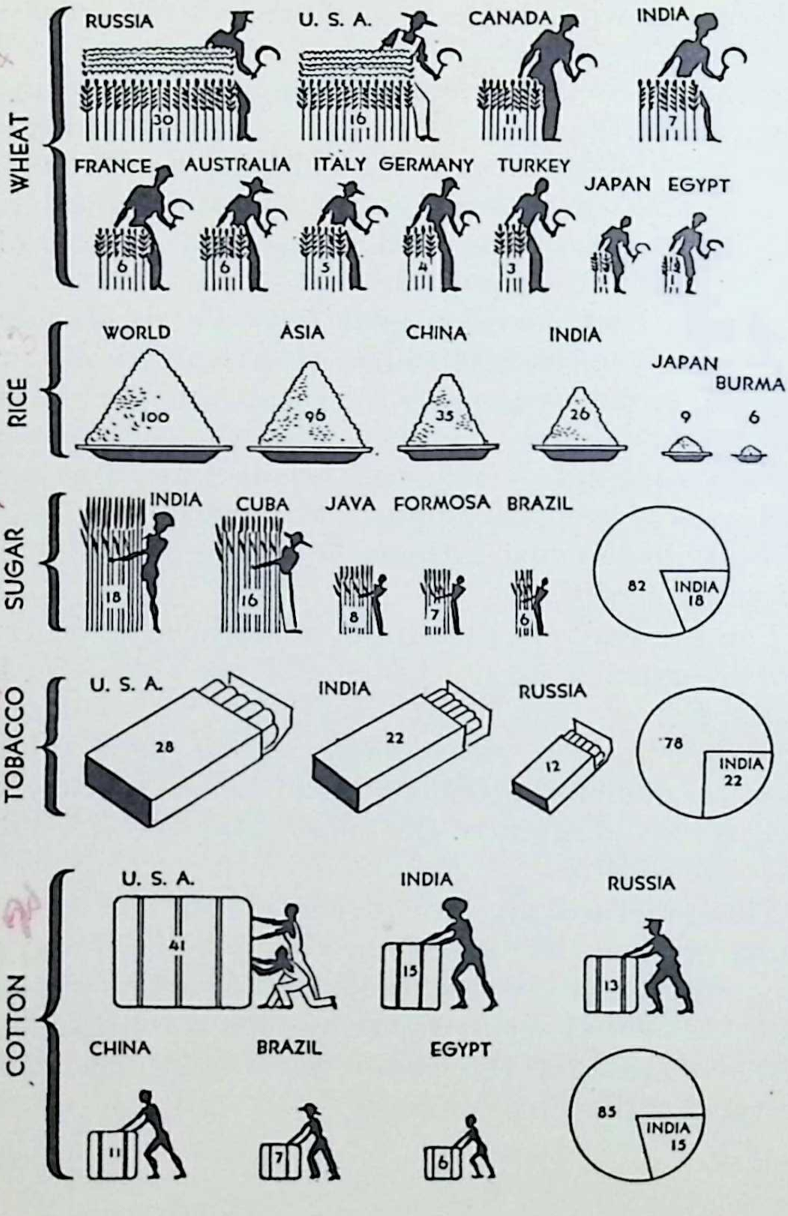
What about the WIND next? The wind, yes, because—quite apart from keeping us fresh and cool—if we were to set up windmills throughout India and capture the energy it contains, according to one author we could harness as much energy in the form of electricity as the whole world needs to employ!

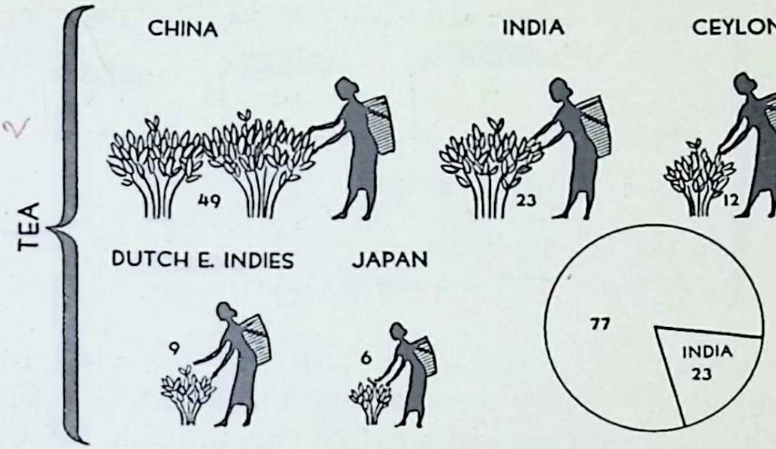
From the wind, let us come down to *terra firma*—our LAND. Now, all the surface of our land is not available for cultivation. On some of it cities and towns and villages are built. There is some which is not available or is unfit for cultivation. Even so it is estimated that something like three-quarters of the surface of our land is free and capable of growing something or other.

Nature itself has done our work for us already over nearly 100,000,000 acres—nearly a fifth of our cultivable land. It has covered up this part with thick woods and supplied us with ready-made forests. An English engineer has calculated that our forests can keep us supplied with 100,000,000 tons of wood in the year, without being any the thinner or worse for it!

For the rest, we can grow, somewhere or other, just everything we need for ourselves. We *can,* I said. For we *don't,* yet. Later on, we shall see how much more we can make of our land. But even so, our land gives not a bad account of itself. Let us look at a few of the many things in which it is so bountiful.

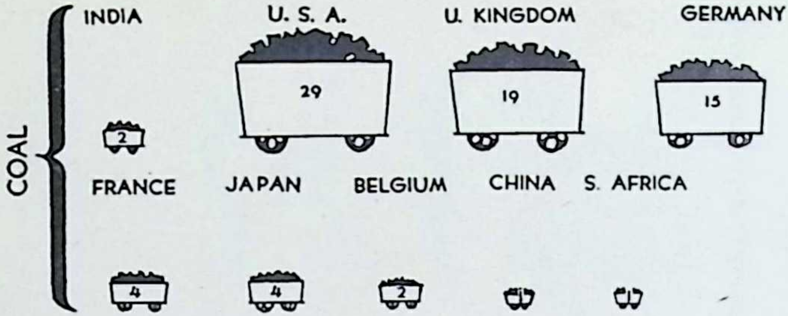
These pictures give you a clear idea of how much India produces of some of the things we need every day. You will see that India produces lots of the wheat, rice and sugar we eat, the tea we drink, the tobacco some of the grown-ups smoke, and the cotton for the cloth we wear.


WHEAT
RUSSIA 30
U. S. A. 16
CANADA 11
INDIA 7
FRANCE 6
AUSTRALIA 6
ITALY 5
GERMANY 4
TURKEY 3
JAPAN
EGYPT
RICE
WORLD 100
ASIA 96
CHINA 35
INDIA 26
JAPAN 9
BURMA 6
SUGAR
INDIA 18
CUBA 16
JAVA 8
FORMOSA 7
BRAZIL 6
82
INDIA 18
TOBACCO
U. S. A. 28
INDIA 22
RUSSIA 12
78
INDIA 22
COTTON
U. S. A. 41
INDIA 15
RUSSIA 13
CHINA 11
BRAZIL 7
EGYPT 6
85
INDIA 15



If you think of the whole world's production as 100, then the numbers on the pictures show each country's share.

So far we have basked in the sun's rays, floated with the clouds, flown with the wind and stepped on firm soil. Let us now burrow underground and look at our hidden treasures. Not all our stocks of minerals have yet been located, let alone unearthed. We know, however, that we have large stocks of COAL, though not by a long way as large as those of some more favoured countries like Great Britain, the U.S.A. and the Soviet Union. We produce only 26 million metric tons a year, although we have coal reserves estimated at 53,000 million tons. The picture on the next page shows how much coal is produced in various countries every year.



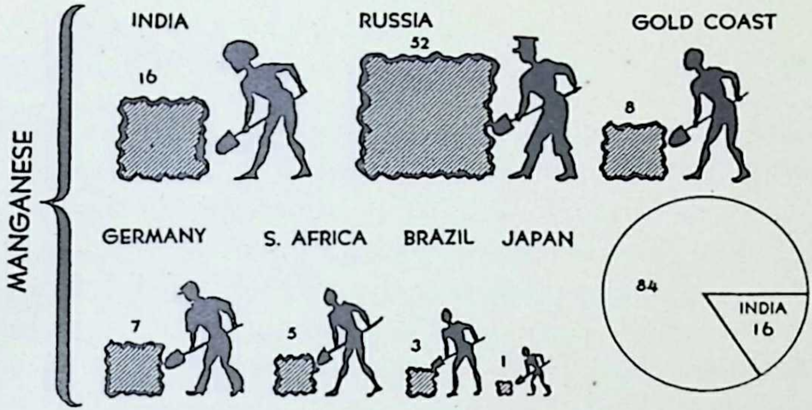
We are much better off in IRON ore, with what are believed by many competent people to be the world's largest reserves, next to those of the United States and of France. Not only that, they are believed to be also in quality among the world's



richest iron reserves. But you will see from the picture that we are using little of our iron.

With the exception of Soviet Russia, which produced 1,336,000 metric tons in 1936, India was the world's largest producer of MANGANESE ore, with

414,000 metric tons—about a sixth of the world total.



I can go on telling you of our natural wealth until your head fairly reels. But I won't. Let us close our catalogue. I only wanted you to realize that India is a country of which you and I may well be proud. Whether India can be equally proud of you and me is, I am afraid, altogether another matter! But that we shall go into a little later. Meanwhile, I am waiting for you to ask me, as you will, if you are intelligent or curious, be asking: 'Yes, but what do we *make* of our wonderful country? To what *use* do we put all its great resources?' I shall try to answer you, but not in this chapter.

III

A PUZZLE

There is a friend of mine who works in an office in Bombay. He earns five hundred rupees a month, which—according to many wise people—is the *most* any man should be allowed to earn for himself in India as things are today, but which I think is the *least* anyone who works honestly for his living should be paid, if he is to live as a really civilized man should do.

Anyway, this friend of mine lives with his wife and two children in a well-furnished four-room flat in a fairly clean and healthy part of the city. His children go to a good co-educational high school. He and his wife are members of a circulating library from which they get the newest books to read and of a club where they play tennis and other games. They have a small car which they drive themselves. Once a year or thereabouts, my friend gets leave from his work and goes with his family on a little holiday somewhere or other in our big country.

Now, quite a few, but *only* a few, people in India live something like that. Some of you who read this book are lucky enough, I guess, to belong to that class. There is no reason, when you come to think

of it, why *everyone* who lives in the cities and towns of India should not live like that. But *do* they?

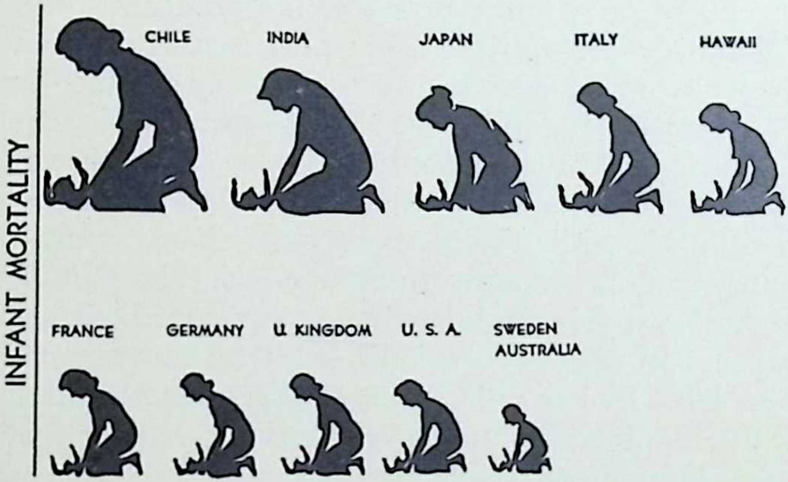
Of course not, you will say, there are all the poor. Quite. The great bulk of our town dwellers are poor—terribly, terribly poor. They live huddled together in dismal, dark and smelly *chawls* or slums, sleeping four or five or even ten in a small, dark, smoky room, eating of the barest, their children denied education beyond what are called 'the three R.s'—reading, writing and 'rithmetic—which, once they leave school, they soon forget. The lot of our common people is dreadful.

The workers in the mills and factories of our towns, whom we—because we live in towns—are accustomed to think of as the poorest people, earn anything from fifteen to fifty rupees a month, with which to maintain a whole family. That is terrible enough, isn't it? Why, even *you*, all by yourself, would find it difficult to live on that! But the worker's wage is almost princely compared with the earnings of those crores and crores of our countrymen who live in villages and cultivate the land, producing food for us to eat and the cotton from which is made the cloth we wear.

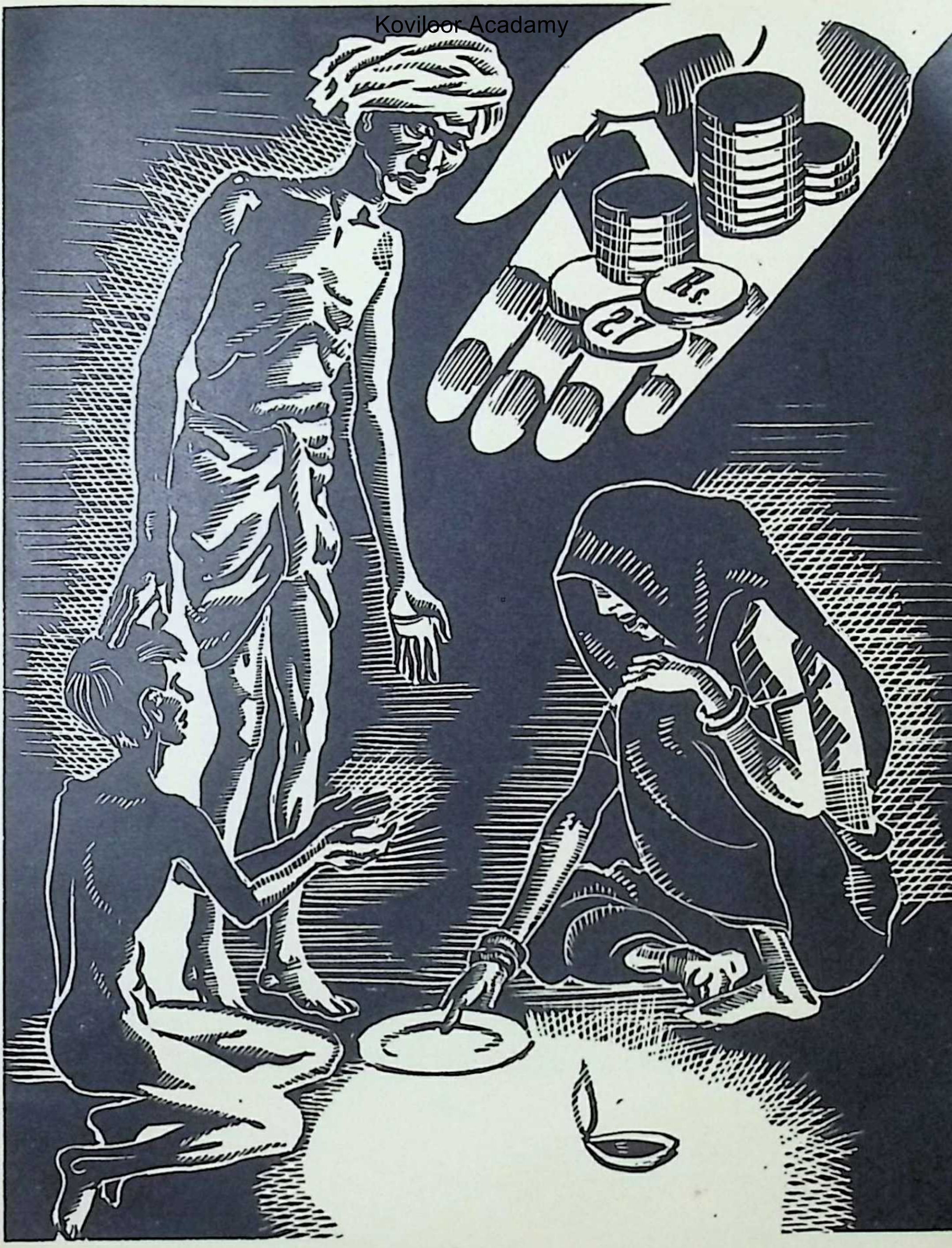
It has become such a commonplace to say that the majority of the Indian people do not get one square meal a day—as a meal is understood in England or America or Australia—that by the time we are grown up we no longer feel horrified at the thought.

Yet it is not an exaggeration but a grim fact. Learned professors in our universities have estimated that the ordinary peasant in our country with a wife and three children has to live along with his family on Rs. 27 a month—just under a rupee a day.

Such are the starvation and the filth and the wretched homes in which they are born that little babies die like flies before they are even a year old. Infant mortality is the big name by which this terrible tragedy is known. You see from this picture that it is four times larger in India than in Sweden.

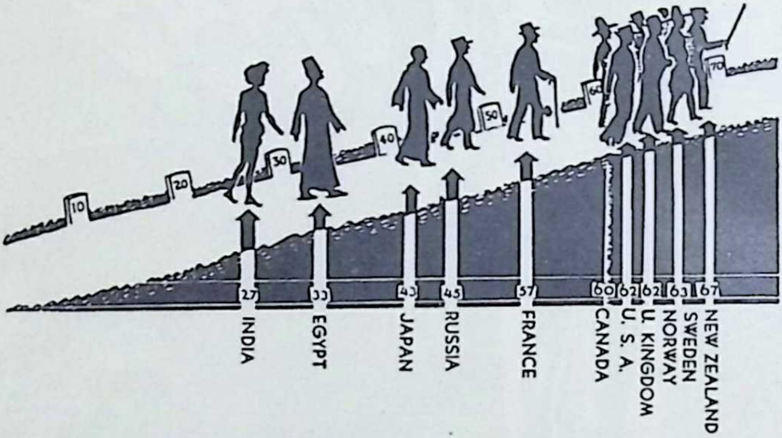


Now let us see: How long do you expect to live? 'Seventy,' you say. 'Or at least sixty.' Well, there's nothing like being an optimist! I am afraid, however, all you, as a boy or girl at school, have a chance to live if you are an average Indian is only


Rs.
12

another 30 years! You don't like the idea, do you? But then you are lucky, you know, having survived your first year of life!

If, for instance, a baby brother or sister were to be born in your home—don't mention this to your mother or father, it'll only hurt their feelings, because grown-ups *are* like that!—the little baby, sad to say, is due to die at the age of 27.



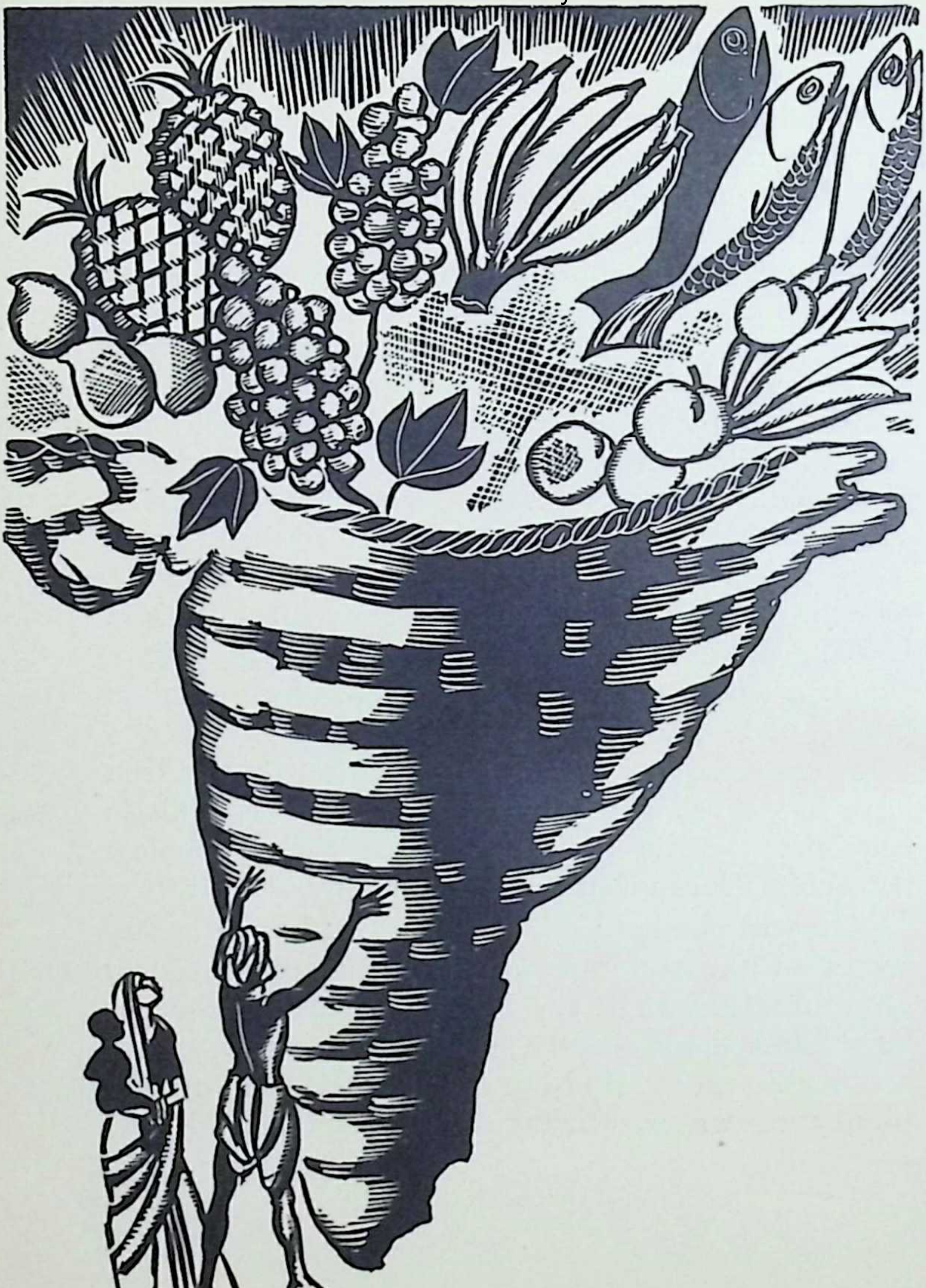
In this picture you can see the nations walking along the road of life. Look at the Frenchman, striding along till he is nearly 60. The New Zealander still waves his stick as he approaches 70, but sad to say the Indian is collapsing before he gets to the 30-year mark.

Why should this be so? Why can't all Indians live just as long and have just as much of the good things of life as my friend who works in that office?

Don't they work as hard as he does? Of course they do. Many of them do the hardest and most unpleasant work and are still the poorest! Unfortunately, according to our present ways of living and arranging things, reward is not always in proportion to the work done. But even if this were not so, even if every one of us was paid equally, our college professors tell us that our income per head of population would only rise from Rs. 64-6-0 per annum, which it is today for the vast mass of our people, to Rs. 78 in the year or Rs. 6-8-0 in the month. Let us try this on a family of five, which is most common. Given a fair and equal division of our country's production, Mr Indian would get no more than Rs. 390 (=78 × 5) a year or Rs. 32-8-0 a month, out of which to maintain himself, Mrs Indian, Master Indian and the two Misses Indian. Work it out—just over a rupee a day for an entire family of five Indians!

Is ours then such a poor country that its children have to starve? Is it a barren, dry desert with little that grows on its land and nothing that lies below it? Is it Nature that has been so unkind to us?

You will shout 'No!' because you have already seen that, far from our country being a particularly unfortunate part of the Earth's surface, India has been blessed by Nature with a huge area, with a hospitable and varied climate, with fertile soil and plenty of water, with rich deposits of valuable



minerals below the ground and thick forests above it, with a large stock of cattle and, above all, with a population, consisting of a fifth of the human race, which is not inferior to any other race in intelligence and other qualities and which has a great civilization and an ancient culture behind it.

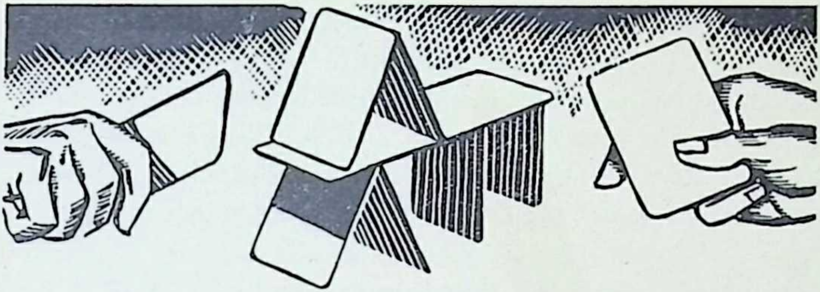
And so India presents a paradox—poverty in the land of plenty. It is a puzzle, but every puzzle has, as you know, a key or clue with which to solve it.

In this book you will find lots of clues, and your young and fresh minds, used to conundrums and crossword competitions, will say at the end: 'But how too simple!' And simple it really is, though all



the statesmen and the politicians and the economists and the captains of industry and the other Wise Men of the East shake their heads woefully and argue interminably over each little twist and turn of the tangle—and just get nowhere!

It is simple, yes. But only if all the young lads and girls of India are prepared to join hands in working out the solution. Which is why it is so important that they should be given a few timely clues in the chapters that follow.



IV

A HOUSE OF CARDS

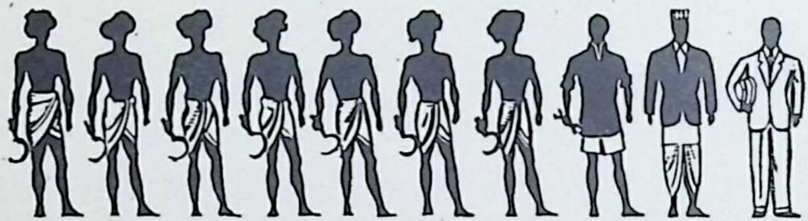
If I asked you to draw a picture of a typical Indian, what would he look like and what would he be doing?

Would you put him in a suit and seat him at a table? Or would he be walking down a street in a long sherwani coat, tight pyjamas, a turban on his head and turned-up slippers on his feet? Or would your Indian be dressed in a snow-white shirt and dhoti with a Gandhi-cap on his head?



Now, I can't draw for nuts, but luckily I have got this artist to draw my Indian for me with his body bare to the waist, his feet bare, the rather thin pagri on his head and a short dhoti being all the clothing he wears. He carries a sickle in his hand. That is how I see the typical Indian.

If you stood ten Indians in a line to represent us, seven would be like my Indian—agriculturists, that is, those who cultivate the land; the eighth would be a factory worker; the ninth would be a shop-keeper or a clerk; and the tenth would be a business man, or a landowner, or a lawyer, or a doctor.



That, at least, is what we learn from all those questions that the Government puts to us every ten years, when everyone is asked his name and age and what he does. That inquiry is called the Census, and we are having another one soon in 1941.



One of the first things the Census teaches us is that, one way or another, some 90 out of every 100 people in India live in villages and 72 depend for their livelihood on agriculture—the cultivation of land. There are crores and crores of such people, spread over 7 lakhs of villages.

Of course, not all of them, even the grown-ups, till the land with their own hands. A few are big landlords, whose lands were left to them by their fathers and grandfathers, and many of them have never known what it is to work. Others are their servants, who go round collecting rent from the cultivators. Yet others are small landlords who do some work with their own hands but hire labourers to help them. Most of those who live in the countryside, however, are small cultivators—they are called ryots—who till their allotment themselves, or else landless labourers who work for some landlord. The number of landless labourers in the villages has gone on increasing. In 1921 there were 291 labourers without land for every 1,000 cultivators with land in India. In 1931, there were 407. So more than one in three of our cultivators are without land and have to hire themselves out, at three or four annas a day.

Now it is not in all countries that so many people live on the land. There are many countries where not *quite* so many people live in villages and not *quite* so few in towns. There are many countries like the United States of America, for instance, where only some 25 out of every 100, or a fourth of the people, work on the land. There are even some countries, and England is one of them, where only 10 in every 100 do so, and most people live in cities

and towns and work in factories and shops and offices.

Once upon a time, not so very long ago, England too was a truly rural country, like India. In the last two hundred years or so, however, the British took to building factories and big cities very fast and England went through what your history books call the Industrial Revolution. A funny name to call it by, perhaps, since a revolution is supposed to happen very quickly and this one went on for two hundred years and, according to some people, is still continuing.

Will India also go through such a change? Will its peasants too go to cities and work in factories? That is a big question and one which you and I will have to answer. We shall leave it till the end of this book.

One thing is quite clear, though, that whatever changes or revolutions India may go through, it is bound to remain—as far as we can look ahead—a country of villages, a country of cultivators, dependent as now for their livelihood on the land and what they can get out of it.

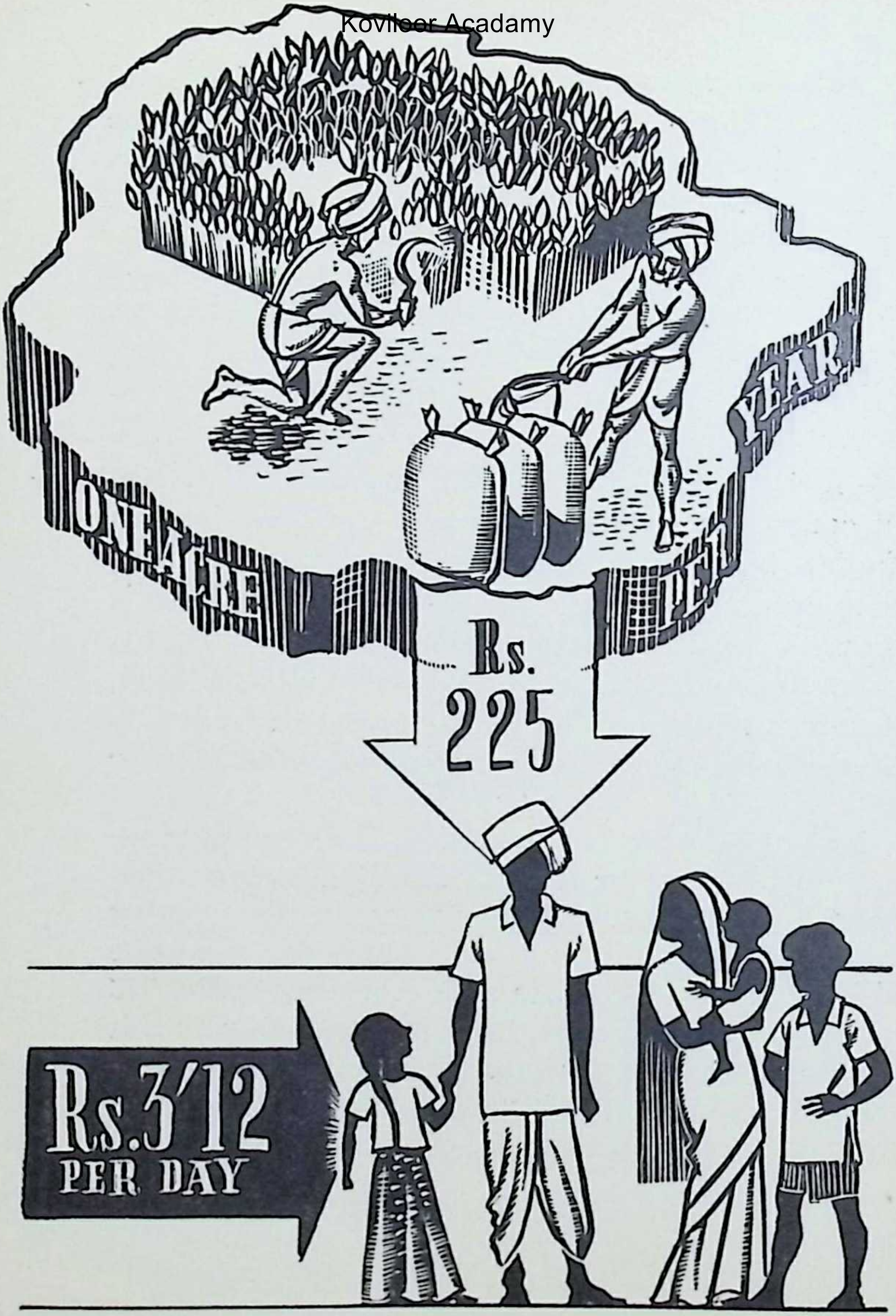
You see, we are increasing so fast in our numbers that, even if industries and cities grow very fast, we shall find it very hard to absorb in them even our extra population! Thus, in a book called *India's Teeming Millions* we are told that by 1948 our

population will be not less than 425 millions and that therefore something like our present entire population will still be dependent on agriculture, even if our industries grow as fast as the most enthusiastic of us can imagine them growing.

If then we are to solve the puzzle which we have set in the earlier chapters, we must first tackle the problems of our land, the people who work on it and the things they produce from it.

We have seen already what a huge country ours is—forty times the size of England and Wales. But of course we can't grow things on *all* the land in India. Some of it is occupied by cities and towns and, even in villages, some of it is built on. Some is mountainous and rocky, some low and marshy, some dry and sandy. Leaving aside all such land, however, you remember we still have three-quarters of the land on which we can grow something or other.

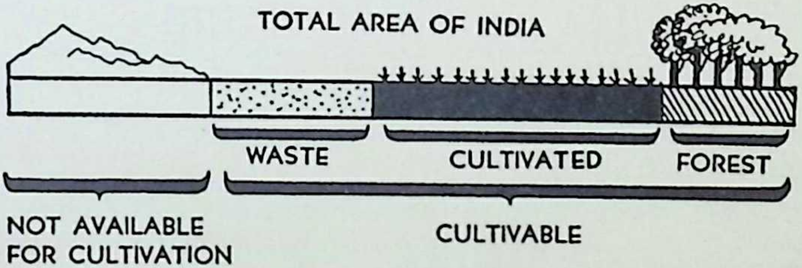
Now this is a tremendous area. If we can produce as much from our land as the Englishman does from his—and England is by no means the country which gets the most out of its land—we should be able to produce from an acre crops worth Rs. 225 every year. And really, there is no reason why this should not be so, because the natural fertility of our soil and the intelligence of our people is in no way inferior to those in England.


ONE ACRE
PER
YEAR.
Rs.
225
Rs. 3'12
PER DAY

Do you know how much this would mean to you and me in terms of money? It works out at something like Rs. 278 per head of population every year or 12 annas per day. Thus for a family of five the income from land alone would be Rs. 3-12-0 per day. And to that would be added the profits of manufacture, the use of minerals and the services of animals.

But here we have an unpleasant surprise awaiting us. We are reminded that the income from every conceivable source of an Indian family of five only comes to just under one rupee a day—or about a fourth of what they should get from the land alone. Obviously, there's something very wrong somewhere.

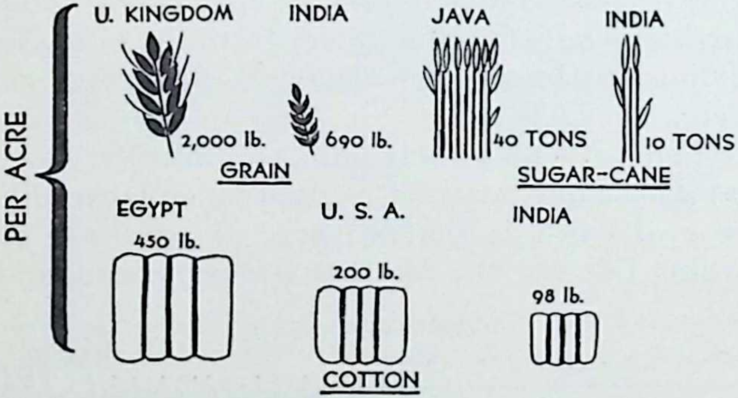
When we look closely into this matter, we find that where our house of prosperity collapses like a house of cards is that an acre of our land gives nothing like the Rs. 225 that it does in England.



We discover that between a quarter and a third of our cultivable land is lying waste and that even the area which is cultivated produces something

like Rs. 56 an acre instead of Rs. 225, or only about a fourth of what it does in England and about a third of what it does in Japan.

Grain is a fair example. An acre of land in England produces 2,000 lb. of grain in a year; in India it yields only 690 lb. Or take sugar-cane, of which I am sure you are all very fond. Forty tons of it grow on an acre of land in Java, only ten tons in India. Cotton is one of our main 'commercial crops', that is, something not to be eaten. We produce 98 lb. per acre. But the U. S. A. produces



200 lb. and Egypt does even better and grows 450 lb. per acre.

Was it very wrong of me then to raise your hopes by building the picture of prosperity I did? Frankly, I am not sorry. If our soil were of distinctly lower quality than 'England's green and pleasant land' or if our people were dull savages, it

would be different. But that is far from being the case. And so, even if we *don't* grow Rs. 225 worth of crops per acre, I insist we *can* and *should.*

And I suggest we set ourselves the job of doing so or, since you can't really do that in a book, of finding the way. Let's find out what's stopping us from putting our land to the fullest use. And here, it is difficult to know where to start, because wherever you put your finger you find something terribly wrong with Indian agriculture.

Cultivators? Starved, illiterate, ignorant, and unemployed for a third of the year. Cattle? Even more starved, ill-bred and ill-used. Land? Cut up into silly little strips, tilled with the same primitive implements that were used in the days of Asoka or Buddha thousands of years ago, almost always starved of manure and thus drained of its precious salts, land on river-banks washed away by the current, other land often dry and parched for lack of water, forests no longer as rich and thick with trees and vegetation as they used to be.

'How on earth did we get into such a mess?' you may well ask. 'You said we were an intelligent people.' I am afraid that for an answer—or rather, for various answers—to your question you will have to go to your history books. Here we are looking *forward,* not *back*. So the question we should attack instead is—how on earth do we *get out* of this mess? For we *can* get out of our present plight—

and quicker than most people think. Of course, people like to throw the blame for their troubles on others. As a cute proverb which is popular in the Punjab says: *'Zamindar ki beaqli, Parmeshwar ka qusur!'*, 'If the peasant's a fool, blame it on God!' It's not Nature that has been unkind to us, it's we ourselves. And in case you find it hard to believe just how stupid we have been, I shall now try to give you an idea.

V

'THE SALT OF THE EARTH'

In the Bible, the finest people are called 'the salt of the earth'. The word salt is used to suggest excellence—the highest quality.

'But there is no salt in the earth,' you will object, 'we get ours from the sea.'

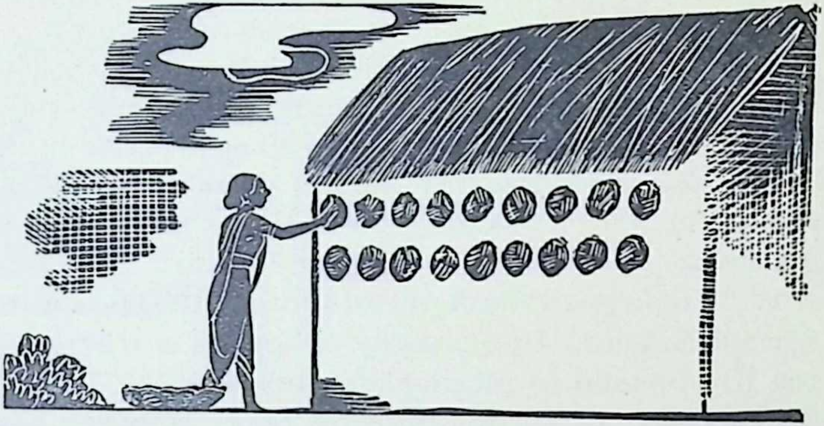
Yes, it's true that the salt you and I put in our food is got from deposits of salt from sea water. But that is only one kind of salt. There are also several other varieties, and some of these are to be found mixed in the earth. Four of these natural salts in our soil are necessary for growing plants and are known as nitrogen, potassium, phosphorus and lime. What they are called does not matter much, but what they *do* does matter a lot.

We saw earlier that what makes things grow on the land is the combined work of sun, water, air and earth. But what is there in the earth itself that helps things to grow? The answer is—the salts of the earth. When these salts are found in a particular plot of land in sufficient quantity and the right proportions, things grow fast and we call that land fertile. When they—or some of them—are absent, the land is said to be barren.

Now, as is true of all good things, the stock of natural salts in the earth is limited. There is only a certain amount of them to start with and they get used up all the time that anything is grown on the land. Thus, an ordinary crop uses up in a year about 20 lb. of nitrogen from an acre of land. So the more salts come out of the land as part of plants or grains, the less there is left in the soil. And the less there is in a piece of land, the less and less it yields in the way of crops. This is an example of what is called the Law of Diminishing Returns.

How in this twentieth century we get anything out of our land at all is, I am sure, what you must be puzzling over. By this time *all* the land in the world should have become barren and we should all be starving! And you aren't so far wrong either. Something like that might have happened, but for one thing—that, in one way or another, men have managed to replace in the earth the stolen salts. They have done so by mixing in the soil things like ashes, bones, dung and lime which contain the very salts which came out of it with crops. Things of this kind are called manures or fertilizers. Another way in which these salts have been preserved is by growing in turn different crops on the same field. As each crop takes some particular salt out of the soil, this prevents any one salt getting entirely exhausted. This system is known as the Rotation

of Crops and has been practised in India for centuries—long before Europeans learned its value.



When you have been in a village or passed through one (if you haven't, you'd better hurry up and do so!) have you noticed the cakes of dried cowdung stuck up neatly on the walls of huts? And have you asked yourself what happens to them? Well, to start with, some of the dung gets blown away as fine dust by the strong winds. Some is used for paving the floor and walls of the villagers' huts. Most is used as fuel—that is, burnt in the fire on which the peasant cooks his food or by which he sits, in winter, to keep warm.

'But what has all this to do with the salts in the earth?' you will be wanting to ask me. Well, only this—that cowdung contains many of these salts and is one of the finest of manures we can get.

Nature has in this way supplied us with many of the things the soil needs. The farmyard cattle serve us in many ways, and not the least important of their functions is to provide us with manure.

And what do we go and do with it? Throw it in the fire and burn it! And incidentally, groundnut cake and bones, which are also good manures, we sell to foreign countries though we need them so much ourselves! Can you imagine millions of grown-up people being quite so stupid?

Well, let's go and ask one of these stupid peasants—we'll call him Rama—why he burns cowdung in the fire instead of mixing it in his land.

'Well, it's useful for burning,' says Rama.

'Yes, but it's much more useful for making the crops grow,' you protest.

'Maybe,' grunts Rama; 'but then how am I to cook my food?'

'Well, *we* cook on gas,' you say.

But Rama just shakes his head. He's never known or heard of gas!

'Well, there's coal—or wood,' you persist.

'Costs too much money,' says Rama. 'Cowdung costs me nothing.'

You wonder how to bring light to Rama's dull mind. Suddenly an idea comes to you. You smile knowingly.

'Have you a five-rupee note?' you ask.

'I haven't one now,' says Rama sadly, 'but when I go to sell my crops, I shall have one.'



'Will you put the note into the fire to keep it burning?' you ask.

'Why, no. How absurd!' And Rama laughs loudly at your stupidity.

'But why is it absurd?' you persist.

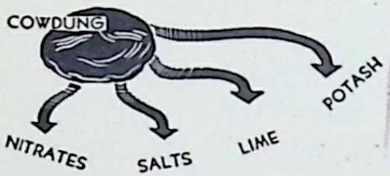
'Because I can buy so many things with five rupees,' says Rama.

'Quite!' you cry triumphantly. 'But don't you see that cowdung too has a better use than to be burnt? Don't you see that if you mix the cowdung in the soil your crop will be three or four times as big and you will have more five-rupee notes with which to buy all the wood you need for your fire and many other things besides?'

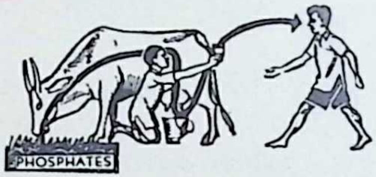
'That's all very well, brother,' answers Rama, 'but please will you tell me with what I am to keep the home fires burning and the pot boiling while I am digging the manure and the crop is growing and the five-rupee notes are slowly trickling in?'

And at this point, not having an answer ready, let's leave Rama for a while and retire to learn a few things about manures and fuels so that we can return later and solve his problem.

The first thing we learn is that, while cowdung contains several salts, there are yet others the soil needs. In other words, cowdung is not a complete manure. As the visitor to the zoo said on first seeing the giraffe, 'There ain't no such thing!'

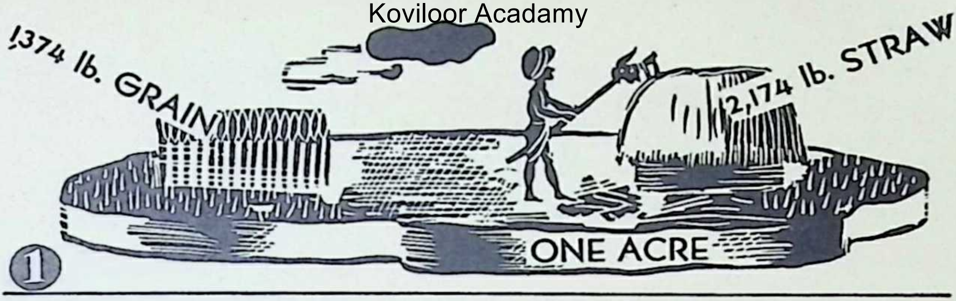


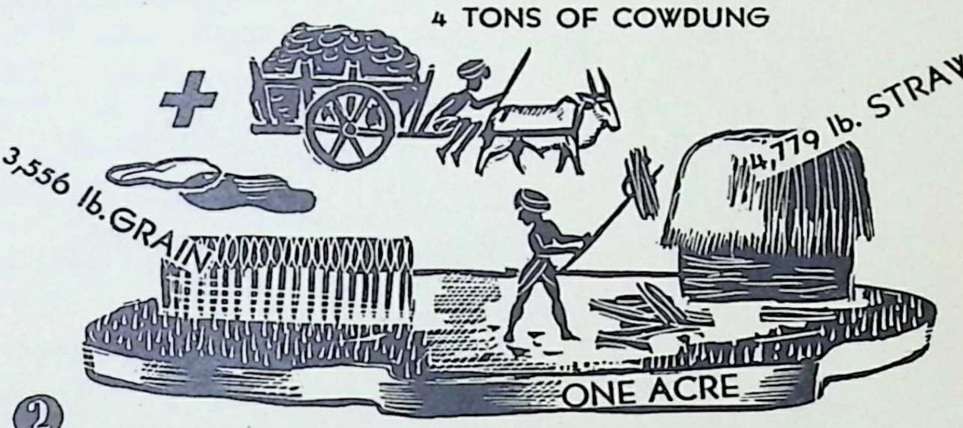
Cowdung contains potash, nitrates, lime and some other salts of value, but there is no phosphorus in it. Do you know why? Because the phosphorus goes into the cow's milk! And we drink it. But unless phosphorus is separately replaced in the soil, there would be none in the cow's fodder, and soon none in the milk we drink! So we learn that along with cowdung, phosphorus and some other things must also be put in the earth.

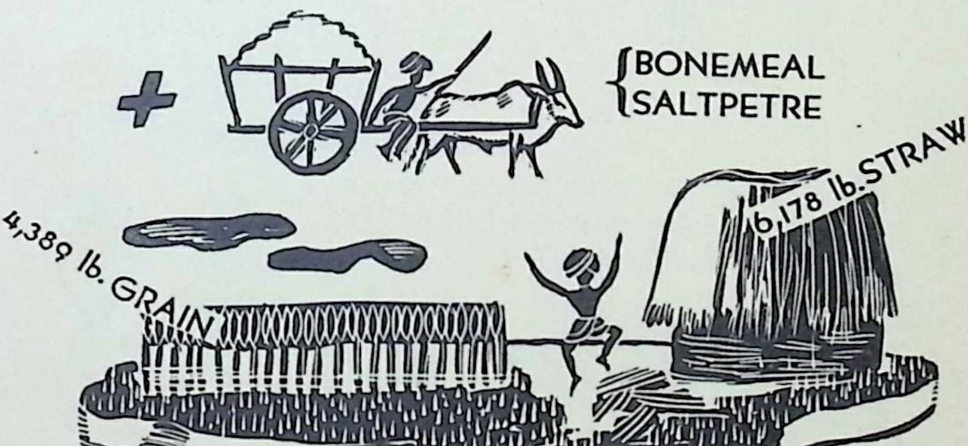


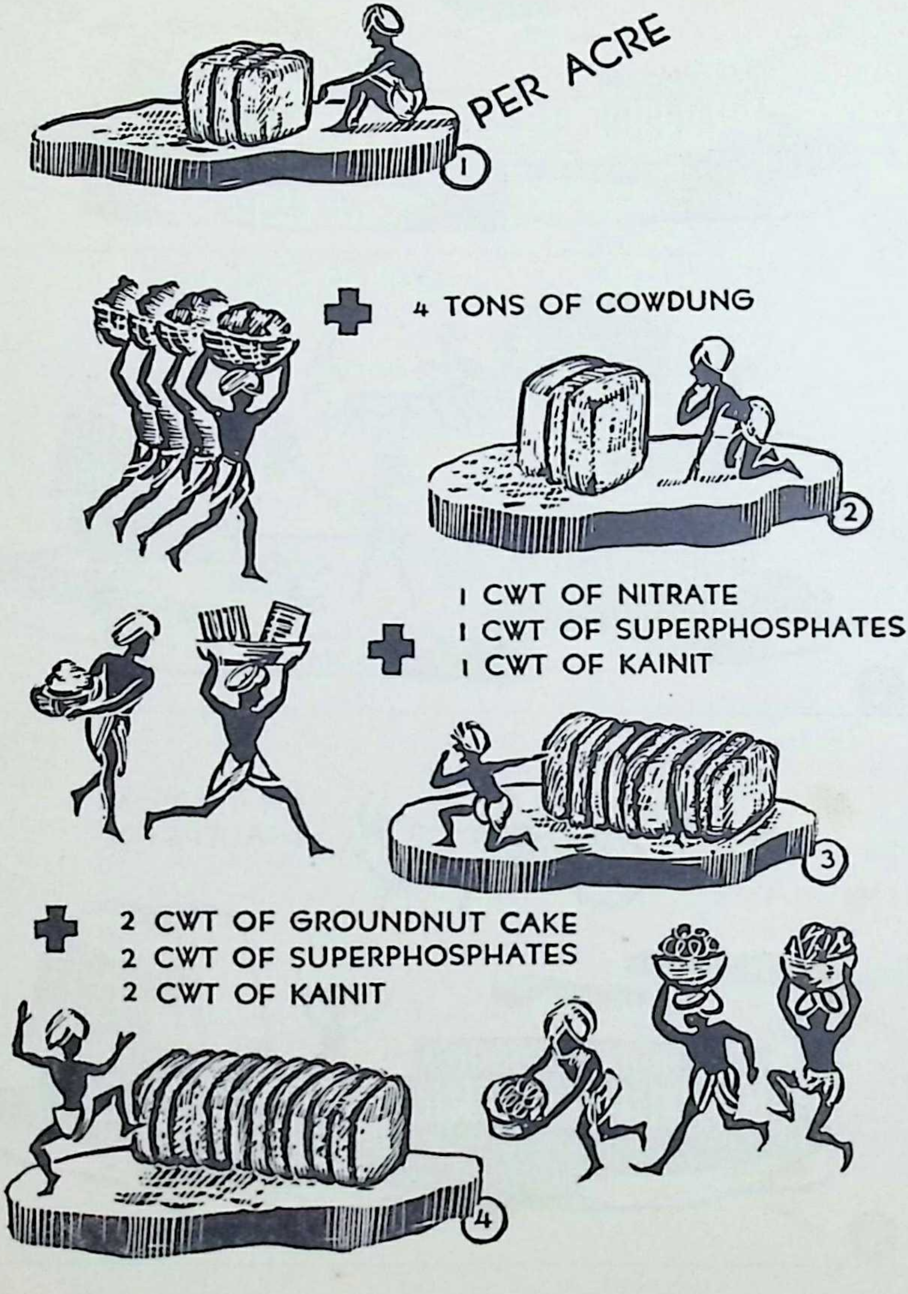
Now, many experiments have been made to find out what happens when different kinds of manure are used. I shall tell you of one or two of them to give you an idea of what a big part fertilizers can play in the cultivation of our land.

There was an acre of land which, without being manured, used to give 1,374 lb. of grain and 2,174 lb. of straw. After less than four tons of cowdung had been used, it grew 3,556 lb. of grain and 4,779 lb. of straw. Sounds wonderful, doesn't it? But more


1374 lb. GRAIN
2,174 lb. STRAW
ONE ACRE
1


4 TONS OF COWDUNG
3,556 lb. GRAIN
4,779 lb. STRAW
ONE ACRE
2


BONEMEAL
SALTPETRE
4,389 lb. GRAIN
6,178 lb. STRAW
ONE ACRE
3


PER ACRE
1
+ 4 TONS OF COWDUNG
2
+ 1 CWT OF NITRATE
1 CWT OF SUPERPHOSPHATES
1 CWT OF KAINIT
3
+ 2 CWT OF GROUNDNUT CAKE
2 CWT OF SUPERPHOSPHATES
2 CWT OF KAINIT
4

wonders were to follow! When, instead of cowdung, bonemeal and saltpetre were next tried, the crop rose still further to 4,389 lb. of grain and 6,178 lb. of straw. So the same acre of land gave *three* times as much as it did before.

An acre of land on which cotton grew showed even more marvellous results. Without manure it used to grow 50 lb. of cotton. Manured with four tons of cowdung, the yield was 80 lb. With 1 cwt. of nitrate of soda and 1 cwt. of superphosphates and 1 cwt. of kainit, the result was 150 lb. Then, it was manured with 2 cwt. each of groundnut cake, superphosphates and kainit, and the crop gave 200 lb. of cotton—*four* times the quantity.

So we see that minerals scientifically used are even more valuable than cowdung. But Rama must know just *which* salts his land needs. All land cannot be fed the same way, any more than all of us can eat the same food. How is Rama to know just what his land needs? His soil must first be analyzed by a chemist who can find out what salts it lacks. And that means Rama must pay the chemist's fees!

Well, supposing Rama pays the fee and finds out what to put in his land along with cowdung, where is he to get it from? He hasn't money. Annoying, isn't it? Because if he could only get the manure, his next crop would give him enough money to pay for the manure and many other things besides. *You've* got it—what Rama needs is manure on

account. He needs credit. He needs a loan of manure, to be paid for *after* his next crop. We must find somebody to give it to him. At present, sad to say, there is nobody doing so.

Supposing we find somebody to give Rama the manure his land needs without asking for cash, Rama will still need something to burn in place of the cowdung. What shall we give him? Gas has not reached the village. Coal costs much too much. But wood? Surely, there's lots of wood in our country. Why is there so little in the village? Here's another little knot for us to untie before we can go any further.

About a fifth of the cultivable land in India is covered with rich forests which are among our most valuable possessions. There are 100 million acres of them, producing things worth Rs. 60 million for us every year. In our climate trees and plants grow so fast that we can take 100 million tons of wood in a year without our forests being any the thinner for it at the end. Here is a Song of the Forest which the Gonds sing:

> Plant the mango, plant the tamarind and plantain.
> Clusters of fruit will weigh their boughs.
> Plant ten *kachnar* trees for flowers.
> In a garden set the *tulsi*.
> Water them unweariedly, but they will always wither.
> But the trees in the forest,
> Which depend on God alone,
> Never wither and die.
> The forest trees grow always.

Some people have an idea that all our forests are in the Himalayas. That is not correct. Which is lucky, because what a lot it would have cost us to carry wood to Madras! Of course, forests are not spread equally over all parts of India. The Himalayas do have splendid forests of pines, deodars, oaks, chestnuts and bamboos, and there are parts like Rajputana and Sind which have none. Taking India as a whole, however, it would be difficult to find a cultivated area much more than 100 miles from a forest which can supply it with firewood. Where there is a lot of rain, there are evergreen forests consisting of palm, ferns, bamboos and rubber trees. The high hills are covered with pine forests, and lower down grow trees like teak and babul.

Maybe, in some places, a railway line or a road would have to be built to transport the timber from the forests to the villages. An English engineer wrote that if the crop increased by 20 per cent, it would more than pay for all the railways and roads that are necessary. But we have seen that with manuring the crops would increase not 20 but 200 or 300 per cent.

But have we enough wood to replace all the cowdung? A little simple arithmetic will give us the answer. Roughly speaking, there is a head of cattle for every member of our rural population. Rama and his family of five have five heads of cattle,

which should provide him with ($5 \times 1\frac{2}{3}$ tons=) $8\frac{1}{3}$ tons of dung in the year. Well, only two tons of dry wood give as much fuel.

In rural India, we have 34 million families like Rama's to supply with fuel. That means we require 68 million tons of dry wood. Have we got that much? I should say so. We can, as we saw, get 100 million tons of wood from our forests without their being any the thinner for it—32 million tons to spare!

But that does not mean that everything about our forests is as it should be. We are not getting out of them anything like what we should. And good as they are now, they were better still in times past. Formerly, the greater part of India was covered with thick forests. Unfortunately, before their full value was seen, our forests were largely destroyed, either because timber was wanted or because the land was wanted for cultivation or for grazing for cattle.

One of the bad results of this was that the land began to be eaten away. That happens in three ways. The rivers take away earth along their banks, until slowly quite a lot of land along the riverside just disappears. The strong rains wash away the layers of earth all over the place until the rocks start sticking out. Land also gets eaten into by the strong winds blowing away the dry earth on top. This action of water and wind is called Erosion.



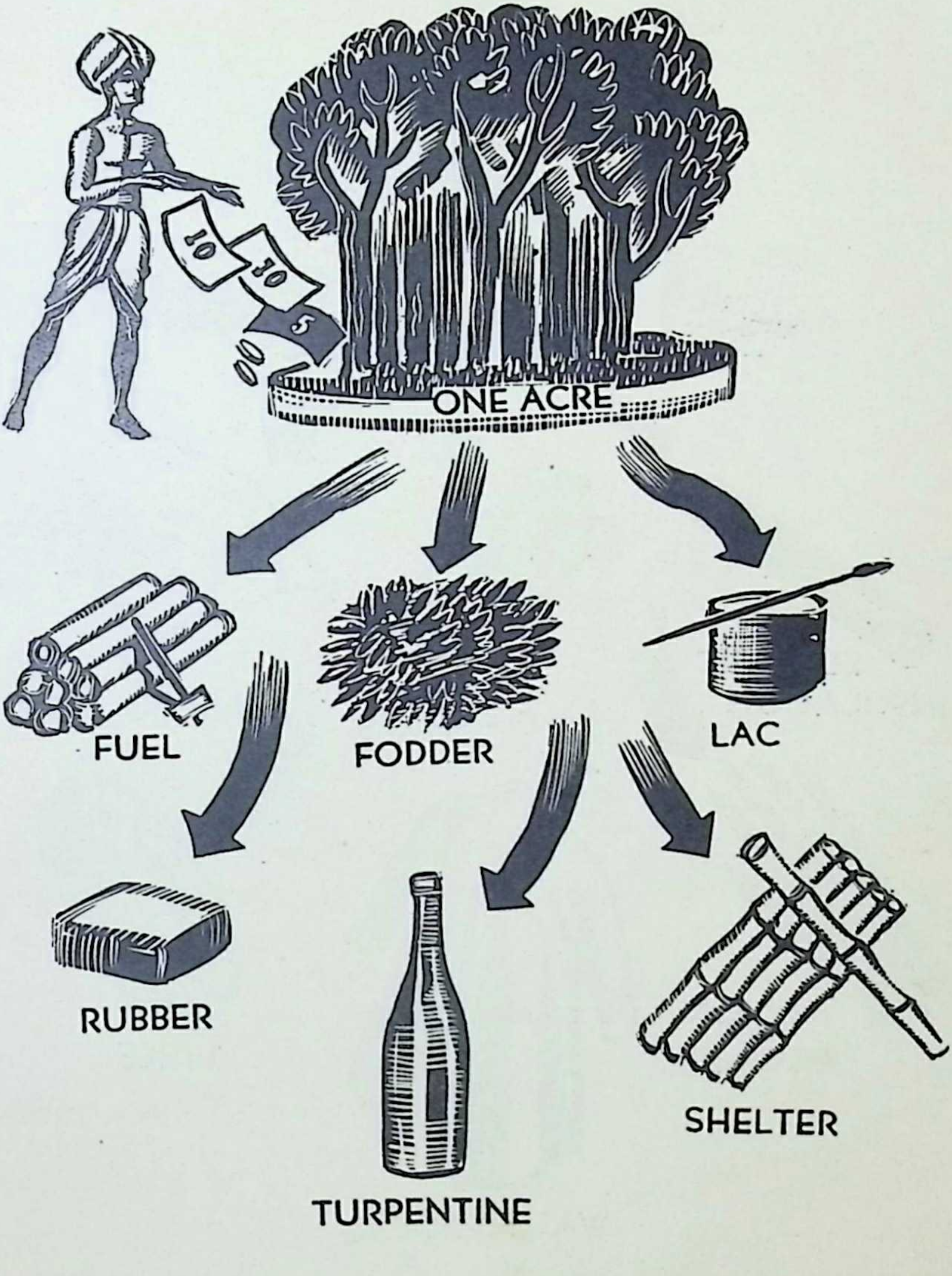
The forests in north-western India where the Emperor Baber hunted the rhinoceros four hundred years ago are now a waterless tangle of ravines. You see the contrast in the picture overleaf.

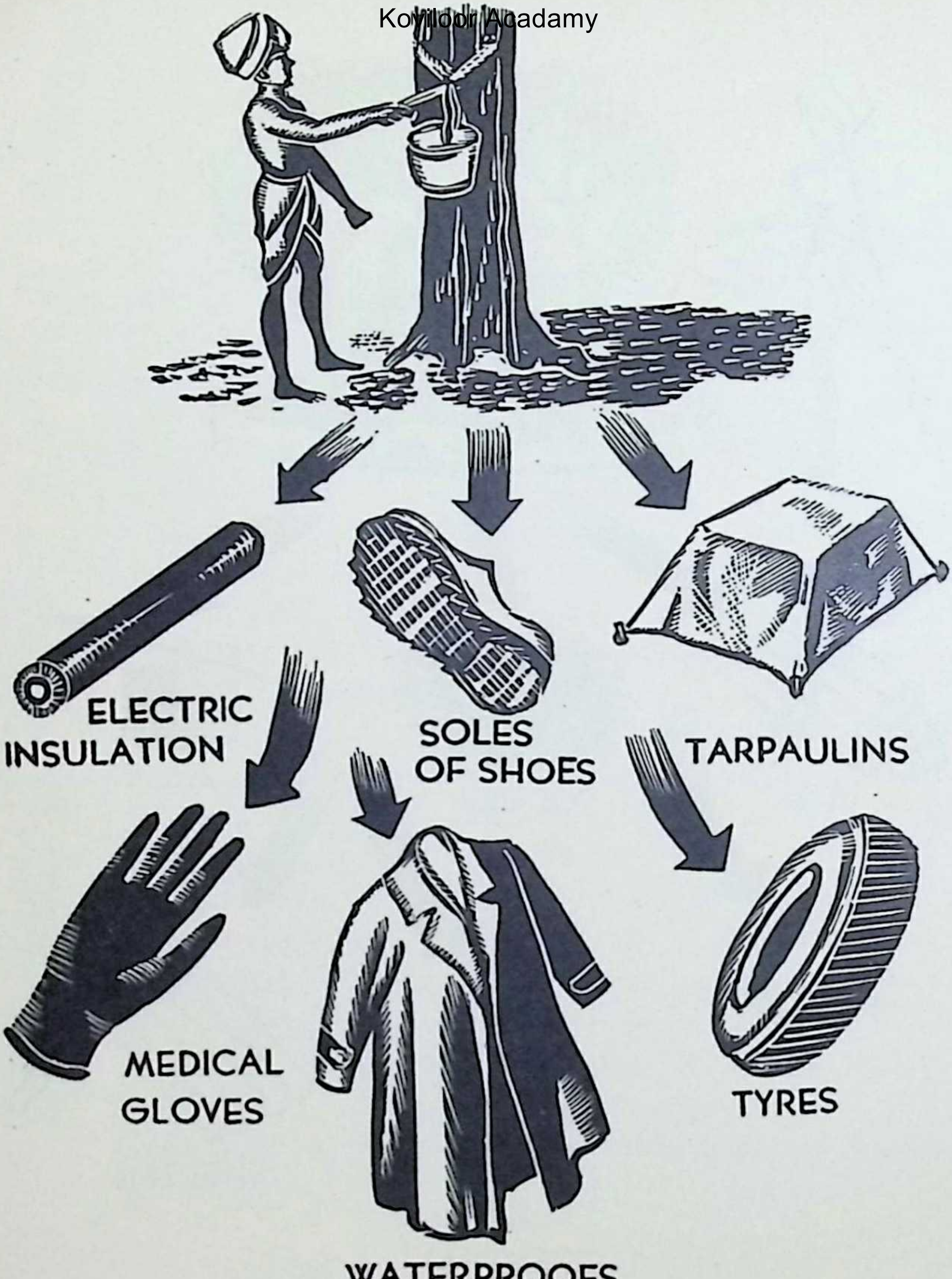
This eating up of the land has been specially bad, for instance, in parts of the United Provinces. The bed of the great river Jumna where it passes through the United Provinces has got 50 feet lower in the last 500 years due to torrents of water in the rainy season rushing down from the mountains in a way that would not have been possible if the forests had remained to break their force.

A district called Etawah was in fact fast becoming a desert, at the rate of 250 acres a year. And so an effort at planting fresh forests, called Afforestation, was made there, to stop erosion as well as to obtain fuel and fodder.

The sort of trees planted there were babul, shisham and teak, and at the end of only three years there were handsome plantations to be seen, two to four times the height of a man.

It cost Rs. 27 per acre—which is a very small price to pay for a forest, when you get in return not only timber for building, but fuel, fodder, raw material for various industries (like lac, turpentine, bamboo, resin, rubber, tanning materials), shelter from the sun, the cooling of the summer heat, regulation of rivers in flood and of waters during


10
10
5
ONE ACRE
FUEL
FODDER
LAC
RUBBER
TURPENTINE
SHELTER

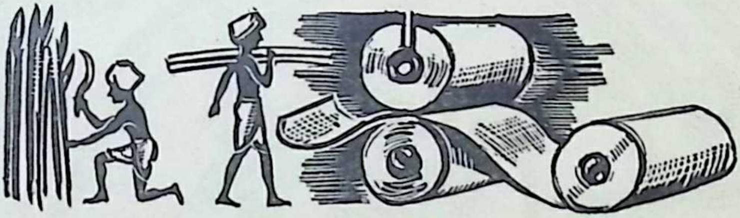

ELECTRIC
INSULATION
SOLES
OF SHOES
TARPAULINS
MEDICAL
GLOVES
TYRES
WATERPROOFS

heavy rains, protection of the soil from erosion and even increased rainfall.

All sorts of things can be made out of these jungle products. There is so much disease in India, and our people need medicines. Our forests with their herbs are a wonderful storehouse of drugs.

Or take the case of rubber. Once upon a time the only use for rubber was to rub out pencil marks. That's how it got its name. But today—why, we should have silence and darkness without it! Rubber imprisons the electric current for us and, without it, the lights would go out and the telephone would stop ringing.

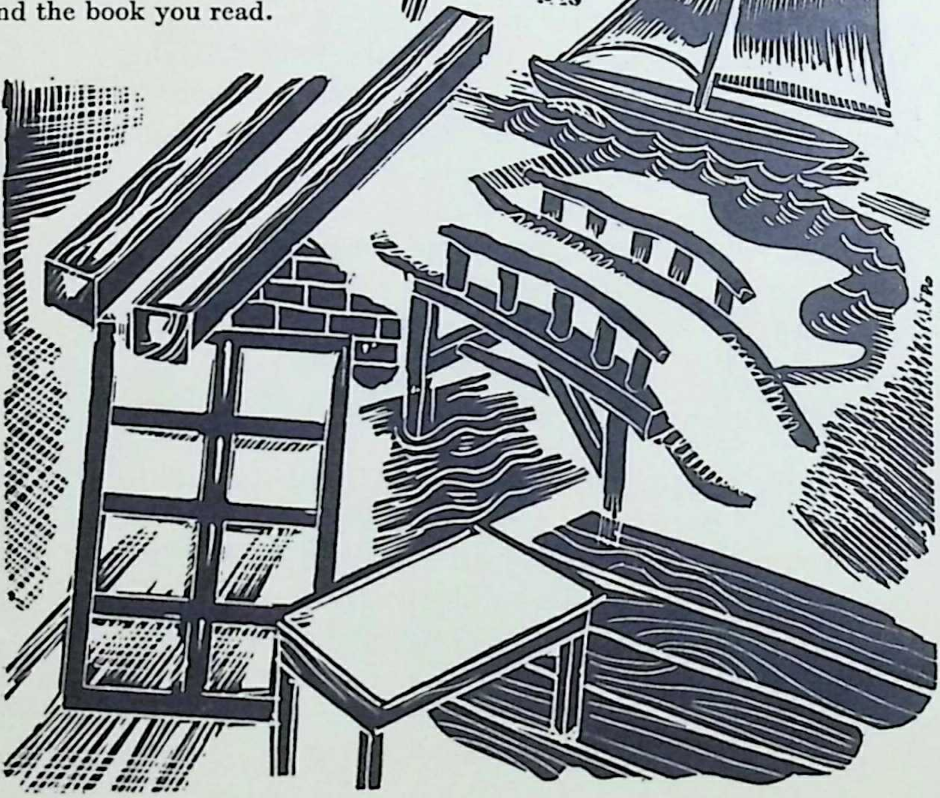
Or take the paper on which this book is printed. Where do you think it comes from? From the forests of Orissa. It is from the bamboos that grow there that this paper is made.



I think a little Russian poem will give you an idea of some of the things our forests can give us. It is from a most exciting book, *Moscow Has A Plan*, which I am sure you would all enjoy reading. So turn over for the Russian Song of the Forest:

Planting forests
What plant we?
Masts for sails
To scour the seas.
Rafters we plant,
Sleepers grow,
Bridges for roads
Where rivers flow.
Planting forests
What is the prize?
Wings that are light
To climb the skies.
Windows we win,
Floors that we need,
Tables, paper
And the book you read.





It would increase our wealth as a nation a lot if we looked after our forests and planted new ones with an eye to all these advantages. If some land near a village were set apart for this purpose and properly watered, in three or four years the village would have a plantation high enough to supply it with more firewood than is necessary to replace the cowdung it now burns. A professor has estimated that if one thirtieth of the land in a village or group of villages in certain parts of the country was set apart and planted with eucalyptus trees, it would be enough to satisfy their needs.

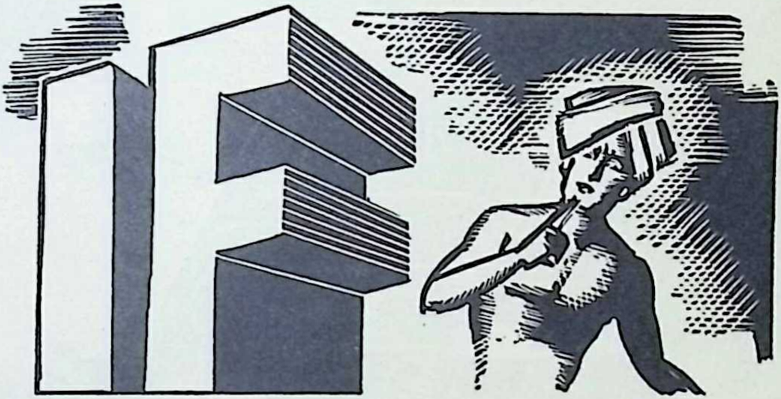
I think we have learnt enough now to go back to Rama and help him to solve his problem.

The first thing we shall tell him to do is to get together with the other folk in his village and to join with them in setting aside land—about a thirtieth of their fields—and planting it with the right kind of trees. But the trees would take at least three years to grow big enough to be able to spare wood for fuel.

Is Rama to go on burning cowdung till then? Of course not. What he needs is money with which to buy firewood in the interval—and he simply hasn't got the money. So someone must be found to lend it to him till he gets his surplus crop through using the cowdung as manure and pays for it. I should think that is the Government's job, but unfortunately the Government in our country

has no money to spare for Rama with which he can buy wood. If Rama is a member of a Co-operative Society, that might give him a loan. And if he is lucky enough to get such a loan, he will soon be able to pay it back from the much bigger crop his land will be growing. On top of that, at the end of three years, the plantation will give him and his neighbours all the firewood they need.

Won't they be ever so much more prosperous then? Yes, but there are some 'ifs' to it. *If* he and his neighbours have sense enough to put aside some land for planting trees, *if* someone gives him a loan and—biggest *if* of all—*if* the monsoon is kind and gives him enough rain for a good crop. For what is the good of burying manure in a piece of land that is too dry through lack of water to grow anything? All our well-laid plans for Rama would, like the 'best laid plans of mice and men', go wrong *if*—





VI

SOME IFS AND BUTS

' Black Cloud, come down, come down;
Flower-bearing Cloud, come down, come;
Cloud like cotton, Cloud like dust,
O let your sweat pour down !

Blind Cloud, Blind Cloud, come,
Let your twelve Brother Cloudlets come,
Drop a little water that we
May eat good rice.

Straight Cloud, Strong Cloud, come,
Lazy Cloud, Little Cloud, come,
I will sell the jewel in my nose and buy
An umbrella for your head !

Soft Rain, gently fall,
In the house the plough neglected lies,
In the burning sun the farmer dies,
O Rain with laughing-face, come !'

Don't you like this song of the village maidens from a Bengali poem by Jasimuddin? It is a rather beautiful poem about the love of a peasant boy and a village girl and it makes the simple village folk come to life before us. And, as this song tells us, one of their main anxieties is to get rain. Sometimes village folk meet and hold prayers for rain to come.

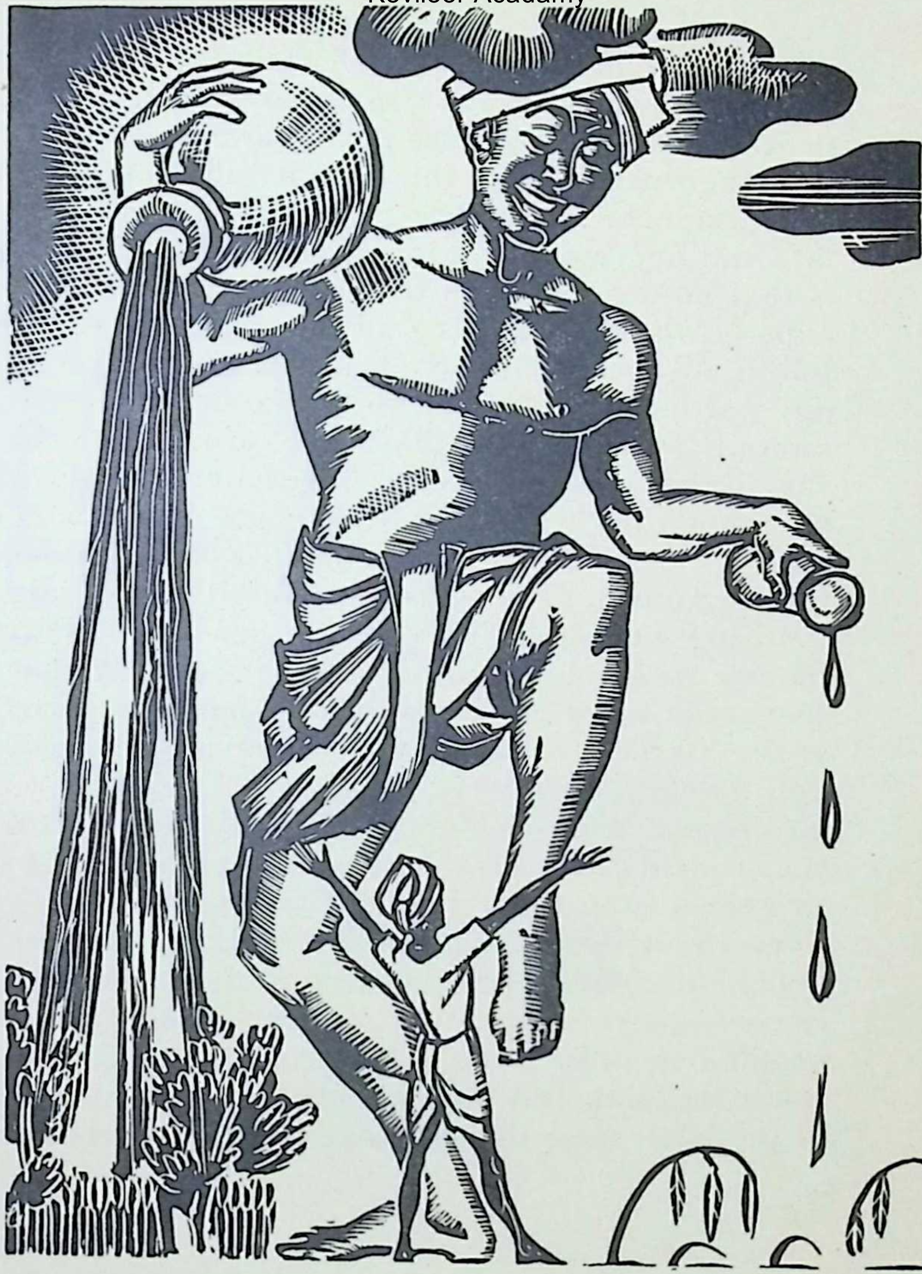
This utter dependence on the rainfall is something peculiar to India. It dominates the life of our people in a way that people in most countries find difficult to understand. But all peasants know how important rain is.

That is why at the end of the last chapter we said that manuring the land would lead to a crop three times as big as it yielded otherwise, *if* there was a good monsoon.

We have seen what a great part the monsoon plays in providing our land with water, without which little would grow on it. That part is played in two ways: first, by the rain which falls throughout the country, and secondly, by adding to the flow of the rivers that come down from the mountains and flow through the plains.

The first function is very important because rivers cannot and do not water *all* the land in our country. There aren't enough rivers for that, and there are large areas which have no rivers at all. So the rain from the clouds is in many places the only water the dry land gets. Of course, as we saw earlier, there are parts of India such as Upper Sind where there is hardly any rain.

Now the trouble with the monsoon is that even where it does come, it is irregular, unreliable and full of tricks. It is like a playful giant with, in turn, very kind moods and very bad ones. You never know where you are! So one year there will be



lots of rain and the next year very little! One year it will rain more heavily in Gujarat than in the Central Provinces, and the next year it will be just the other way about! One year it will come early and disappear soon. The next year it will come late and linger on for a long time! The sad thing is that no one, not even the Government weather-experts who are watching all the time, can really tell in advance what sort of monsoon is coming in any particular year. And so the farmer has to go on waiting anxiously with one eye turned up to the sky. Every year there is this huge gamble in which our farmer must, whether he wants to or not, take part. The end of the season may leave him either rich or ruined. Then again, even with good rain there are some crops like rice and sugar-cane which require *such* a lot of water and *so* regularly that they only grow naturally in the most favoured areas. And the second or winter crop always needs extra water.

Must our peasants always be left to the mercy of the elements like this? Can't anything be done to free them from this cruel uncertainty?

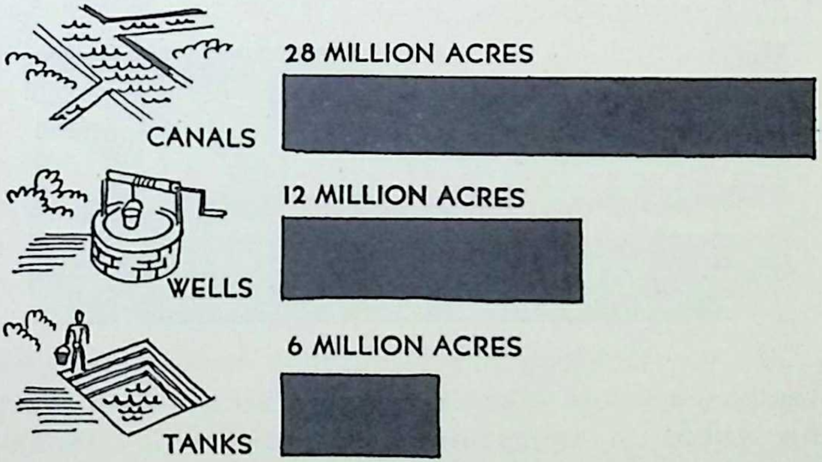
Yes, a lot can be done. And something has been done, but there is still much more to do. Where, of course, a river flows past or near the fields, it is possible to draw some water from the stream to water the land. But that is true of only a very little of the land. For the rest, canals have to be built

into which water from the rivers can be turned and taken through parts of the country which lack water. Watering the land in this way is called Irrigation.

From quite ancient times people have tried to store water in huge tanks and to reach water under the ground by wells. In the last hundred years, more has been done in the way of utilizing the surplus water of big rivers by means of canals, and today a *fifth* of the cultivated land of India is irrigated in one way or another.

Wells are the oldest and most effective form of irrigation and serve about a fourth of the irrigated area in India. There are believed to be 13½ million wells in India.

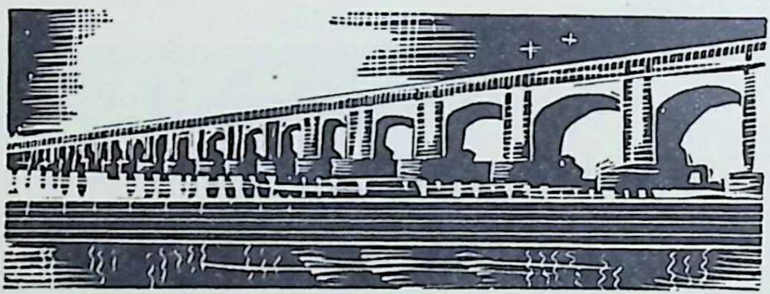
Tanks also are ancient devices. Popular in Madras where there are 40,000 of them, they are



practically unknown in the Punjab and Sind. You can't store much, can you, if you have only 3 inches of rain in the year?

It is canals which are now the most important form of irrigation, there being 70,000 miles of them. Of 52 million acres irrigated in 1936-7, 28 million acres were irrigated by canals, 6 million by tanks, 12 million by wells and 6 million otherwise.

Canals get their water either from rivers from which water is diverted, as in the North and in Madras, or from rain-water stored up during the monsoon in lakes made by building a dam across a valley. You can do this where the rainfall is heavy and the country hilly, as it is in Bombay and the Central Provinces. Dams or barrages can also be built across rivers, as has been done in the case of the Sukkur Barrage in Sind across the river Indus.



Most irrigation works give a rich reward in increased crops, and the farmer can gradually pay for them in taxes to the Government. Some,

however, are only meant to guard against famine in places where the rainfall is very uncertain like the Deccan. These are called 'protective' works, and the others are called 'productive'.

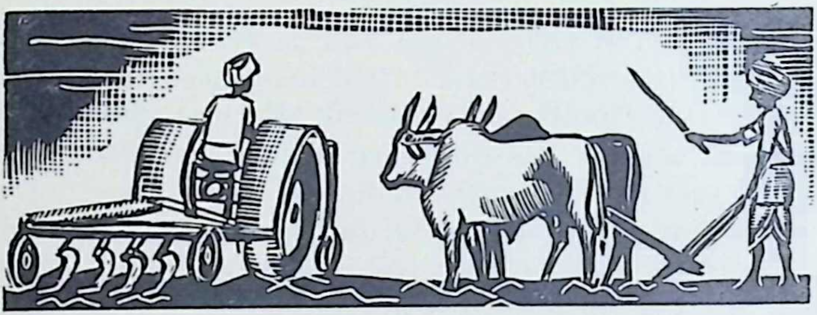
Not all parts of the country have benefited equally from irrigation projects. While Sind is lucky enough to have 73·7% of its cultivated area irrigated and the Punjab 44·1%, Bengal has only 6·2% to its credit, the Central Provinces and Berar 4·2% and Bombay, lowest of the low, 3·9%. Of course, Sind needs more irrigation than Bombay, but even so what a lot remains to be done! We want more tanks and wells and canals—canals from rivers and from reservoirs of rain-water collected in valleys—until almost *all* our land can fall back on irrigation of one kind or another. A well can be sunk and fitted with a pump, and where a farm is too small to afford it, several farmers can join together to pay for it.

Even if land is properly fed with fertilizers and given enough water, however, it will hardly be of much use if it is not planted with good seed, properly ploughed and tilled, and the crop carefully harvested and stored.

Till a hundred years ago, all the work of cultivation was done the world over by the human hand with the help of cattle and horses.

The use of the steam-engine in factories gave people the idea of using steam power on farms in

place of the labour of animals. A machine is quicker, and does not have to be fed such a lot. So, all sorts of machines for crushing and sowing seeds, ploughing, harrowing, winnowing, threshing, harvesting and for pumping water began to be used in the countries of Europe.



Later, oil replaced steam for driving these machines, and nowadays electricity is also being used. A motor tractor can plough five acres of land in a day, where a man and a horse can plough only one. In America, cows are not now milked by milkmaids but by electric machines, which also make cream and butter 'untouched by human hand', and therefore all the cleaner and safer. In Sweden, experiments are being made to see if things will grow quicker if the soil is warmed by passing an electric current through it by means of an underground cable!

Are machinery and the inventions of science being used for getting the most out of our land too? Alas,

no! Our cultivators use the same old wooden plough—though some do use an iron one—and the same methods and implements as were in use thousands of years ago. There are several reasons for this. Our people are so poor, and machines cost money. On the other hand with 10 crores of landless labourers in our countryside, labour is cheap. Why buy a machine to help you in your work when you can hire a 'hand' so cheaply? Thus, our surplus rural population delays the introduction of improved appliances. Another reason is ignorance. While the rest of the world has put science at the service of agriculture, most of our peasants don't even know there is such a thing as a motor tractor! They don't care about the quality of the seed they plant, they use old-fashioned tools and implements, and they store their grain in a careless and wasteful way.

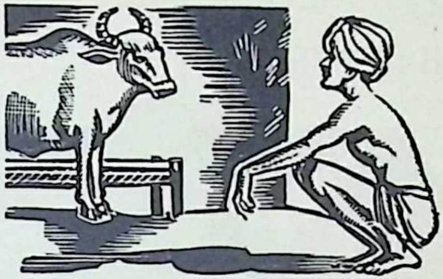
Our village folk need badly to be taught—not only how to read and write, but how to do their work properly. The Agricultural Department of the Government has officers who go out to give advice to cultivators. But they are so few that in the Punjab each of them has 9,000 farms to look after! Even if he keeps moving all the time, this official would not be able to visit the same farm again for several years. But what is wanted is day-to-day contact. Engineers too should be sent to the villages to teach the men how to use machines. And these machines must be sold to them as cheaply as

possible, which means that big factories should be set up where such machines and tools can be made in large numbers. They should be carried to the villages by our railways at reduced fares.

Among the things which the peasant uses for cultivating his land are his cattle. Generally, there is a pair of bullocks and a cow on the farm, but that is not so everywhere. Some years ago, Mahatma Gandhi was going on a walking tour through the villages of Orissa, which is one of the poorest parts of our country. I was lucky enough to be with him on his march for ten days, and during that time I remember we came across several villages where there was no cow at all, and therefore no milk. I felt sorry for the poor little children in those villages. They looked so puny.

Next to the land, his cattle are the peasant's most precious possession. They are useful to him, you see, in so many ways. The bullocks draw the plough up and down his fields and pull the cart to and from the market. The cow bears young calves which fetch a fair price. She gives milk, which the peasant's children need so badly. Besides, as someone has said, 'in a vegetarian country, what can be worse than to have no milk, butter or *ghee*?' In fact, everything about these animals—their skins, teeth, bones, horns and hoofs—can be put to some use for making other things. And let's not forget the cowdung. Which is perhaps why the farmer is so

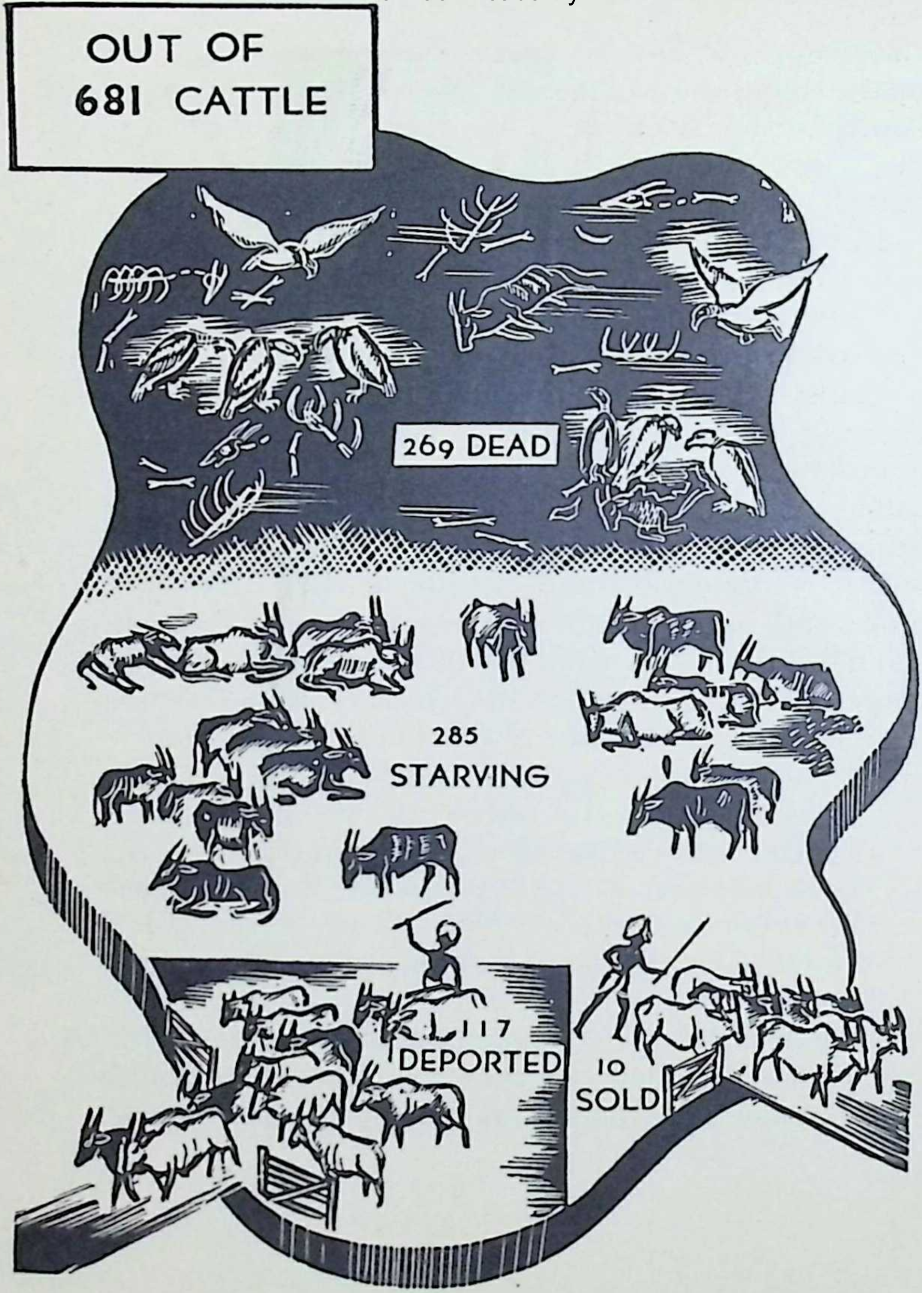
anxious not to lose his cattle that he and his family often sleep in the same room with them!



But though we guard our cattle well, we don't bother to feed them properly. Most of our cattle are really starving. There is not much land set apart for growing their food, which is called fodder. The monsoon makes young grass grow and then the cattle eat well, sometimes too much, and get indigestion! But by December there is little grass left and from then till June the life of the cattle gets more and more pitiable. They roam sadly about the bare, dry fields and look like skeletons. Where there is famine, the lot of the cattle is simply awful. This is what I read in my morning paper:

> The marketing officer of Karachi, reporting on famine conditions in Tharparkar District, says that out of a total of 681,000 cattle in the district, about 269,000 have died, 117,000 have been sent out of the district, 10,000 have been sold for prices from three rupees to ten rupees, and a majority of the remaining 285,000 are on the verge of death due to scarcity of fodder.

Even less trouble is taken in growing food for cattle than for men. If that was not so, we could easily make two blades of grass grow where one



OUT OF
681 CATTLE
269 DEAD
285
STARVING
117
DEPORTED
10
SOLD

grows now. If we did that, there would soon be enough food for as many cattle as we *need*. But *not* for all the cattle we *have*.

There are believed to be 540 million cattle in the world, and of these we have 180 million. That means we have about a third of the cattle in the world, and that is much too many. The Egyptians have 25 cattle for every 100 acres of land they cultivate. The Dutch, who are keen on cattle and on making butter and cheese, have 38 for the same area. We have 67. Like ourselves, there are too many of them! No wonder we cannot find enough food for them.

Why is this so? Because we are *such* a kind people! In other countries, people kill and eat the flesh of cattle which are not needed for other purposes. In India, Hindus will not eat beef and none of us will kill even the most useless living thing if we can possibly help it. But we don't mind starving our animals—oh, no! Our motto seems to be—

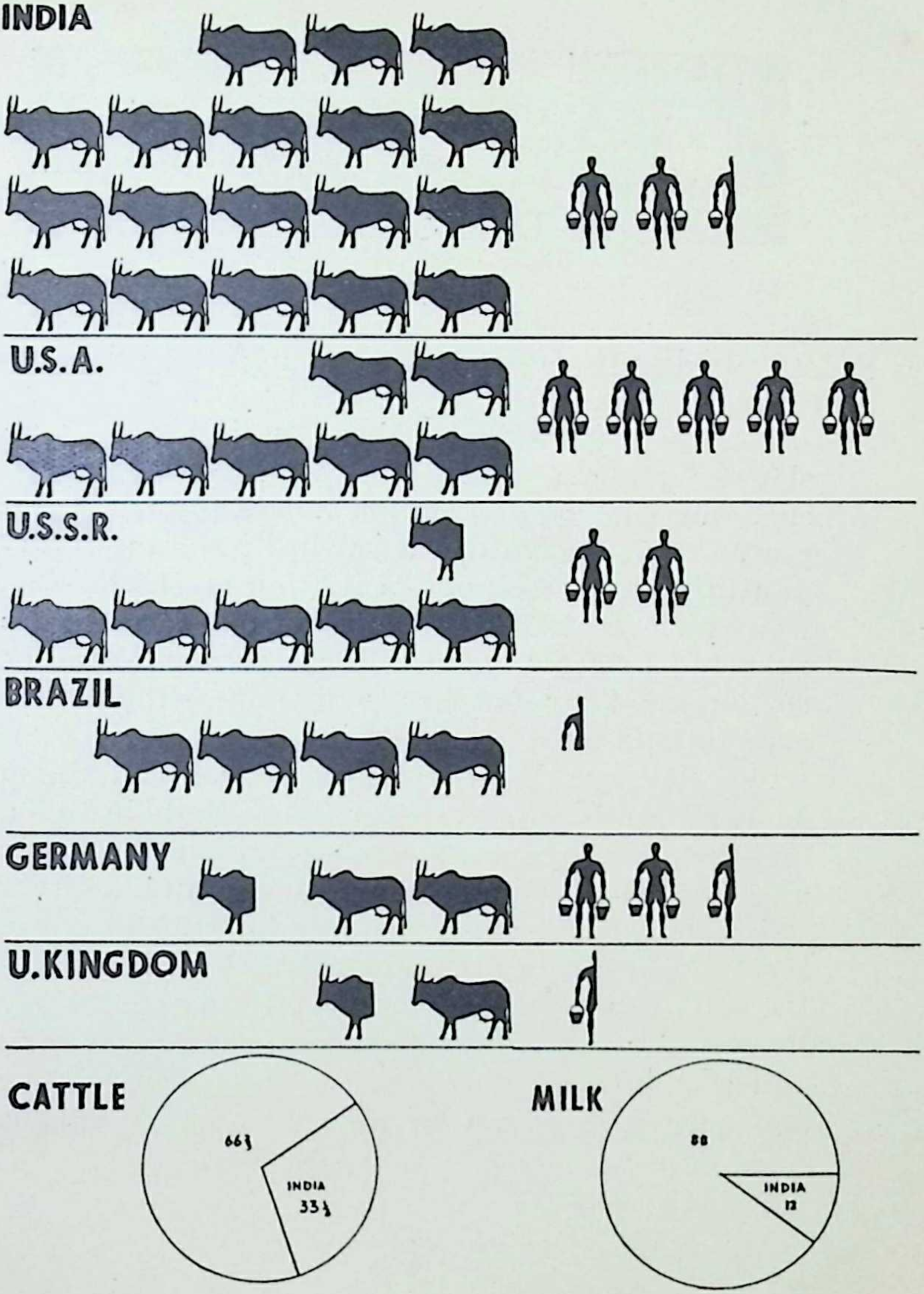
> Thou shalt not kill, but need'st not strive
> Too busily to keep alive.

Don't you think it would be much kinder if we had less cattle but fed them properly and treated them better? And wouldn't it be more useful too, because they would do more work for us and give us more milk? At present 70 cows and she-buffaloes out of 100 give us no milk at all. Most of the others

give $1\frac{1}{2}$ lb. a day when they should be giving 5 lb.

In the picture each animal stands for a crore of cattle, and the number of milkmen is proportionate to the quantity of milk produced in each country. You see that Germany gets as much milk from $2\frac{1}{2}$ crores of cattle as we do from 18 crores.

All this time we have been worrying about manure for the land, and water for the land, and modern tools and strong cattle to cultivate it with. But there must first be enough land to cultivate, mustn't there? Well, sad to say, we haven't got it. 'What!' you will exclaim. 'A huge country like India and not enough land?' And you'll begin to wonder if I've suddenly gone crazy. But don't get alarmed! I'll show you it's the sad truth.


INDIA
U.S.A.
U.S.S.R.
BRAZIL
GERMANY
U.KINGDOM
CATTLE
66⅔
INDIA
33⅓
MILK
88
INDIA
12

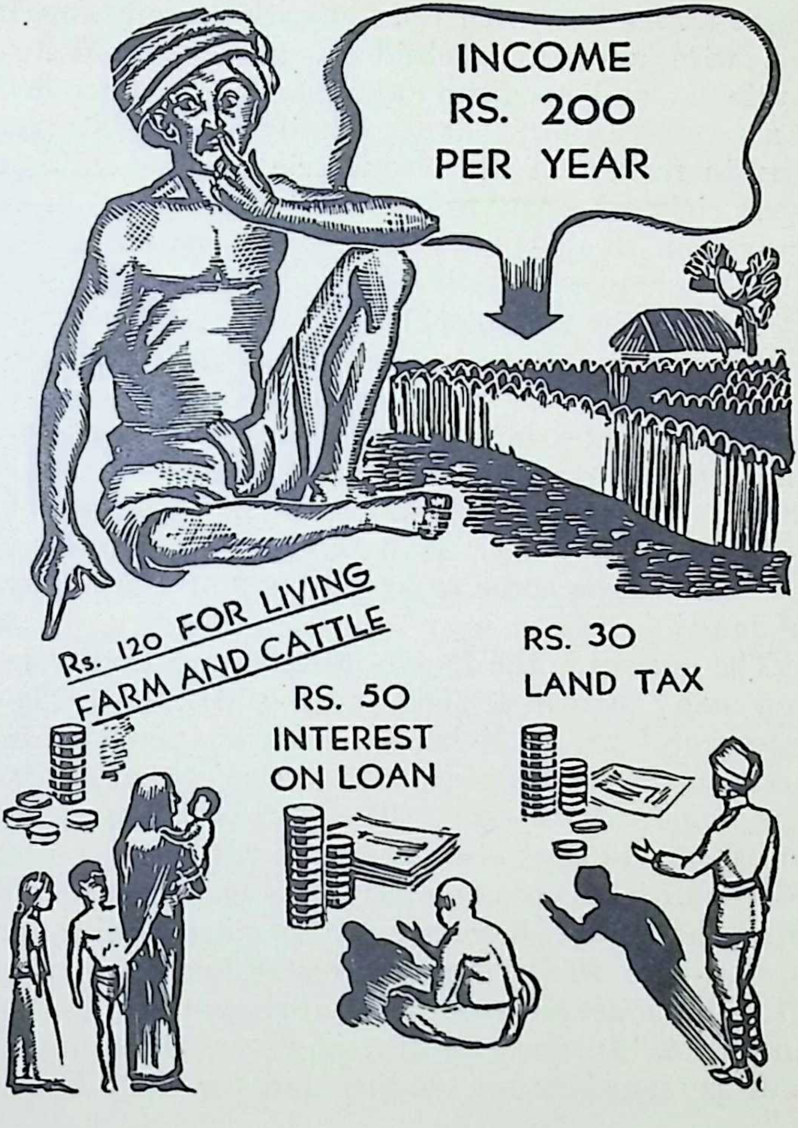


VII

NOT ENOUGH LAND!

If somebody were to give you just one small sheet of paper and ask you to write an essay on some big subject, you couldn't do it, my lad, could you? Or if I gave you a yard of wool and asked you to knit a jersey out of it, you, my little lady, wouldn't even try! But most of our farmers are expected to grow enough wheat or sugar-cane or cotton for their families to live on without half enough land on which to do it.

Now let's see how much land our friend Rama has. We find that, like so many peasants in India, he has 4 acres of land. These 4 acres are not all in one block, but there's one piece here and another strip there, with other people's land in between. His land produces for him things worth let us say Rs. 200 every year. Out of this, Rama has to pay Rs. 30 to the Government as land revenue or tax; and Rs. 50 he pays as interest on some money he had borrowed from a money-lender in the village.


INCOME
RS. 200
PER YEAR
Rs. 120 FOR LIVING
FARM AND CATTLE
RS. 50
INTEREST
ON LOAN
RS. 30
LAND TAX

That leaves him with Rs. 120 to spend on himself, his wife and three children, his cow and two bullocks, and his farm ; that is, Rs. 10 a month! Any wonder then that the family are half-starved and in rags, that he has malaria and his children have rickets? Any wonder that his cattle too look famished, their bones sticking out painfully, and that his cow gives only $1\frac{1}{2}$ lb. of milk a day when she should be giving 5 lb.? Any wonder they all live in a hut with just one room, Rama's family at one end and the cattle at the other?

Do you know how much land farmers cultivate in other countries? The British farmer cultivates 26 acres of land, while the Canadian manages to look after 140 acres. How did Rama and most of our cultivators come to have only 3 or 4 or 5 acres of land?

The answer is the Law of Supply and Demand—too many mouths to feed and too little land. The number of people living in India has gone on increasing year after year, but the size of the country has remained the same. That has been happening in other countries also. There, however, cities with big factories have come into existence and people from the villages have gone to the cities to live and work there. In Germany, industry found room for 25 million people from the villages between 1870 and 1914. In our country, however, three out of four persons depend on the land for their living.

The result is that more than half the cultivators in India haven't enough land to till.

Rama's grandfather had much more land than Rama has, but he had four sons, and when he died his sons decided to divide the land between them. The law says that when a Hindu dies, his sons can divide the estate and take equal shares. So they each took a fourth of the land. Then Rama's father died, and Rama and his brothers again divided the land their father had, and so each of them got only 4 acres.

And even these 4 acres are not all in one piece, because every time the land was divided the brothers wanted a little bit of each kind of land in the farm. It wouldn't have been fair any other way! Each took a little strip of the good land, a little piece of the ordinary land and another fragment of the dry land. What is a fragment? A little piece, a portion, a chip or a splinter, into which a bigger thing is divided. Well, that's just what most of the farms in our country are—pieces or strips or fragments of bigger farms that have been broken up. Sometimes these plots are so narrow that it is difficult to turn the bullocks round while ploughing! This is what is described in history books as the Fragmentation of Holdings, or

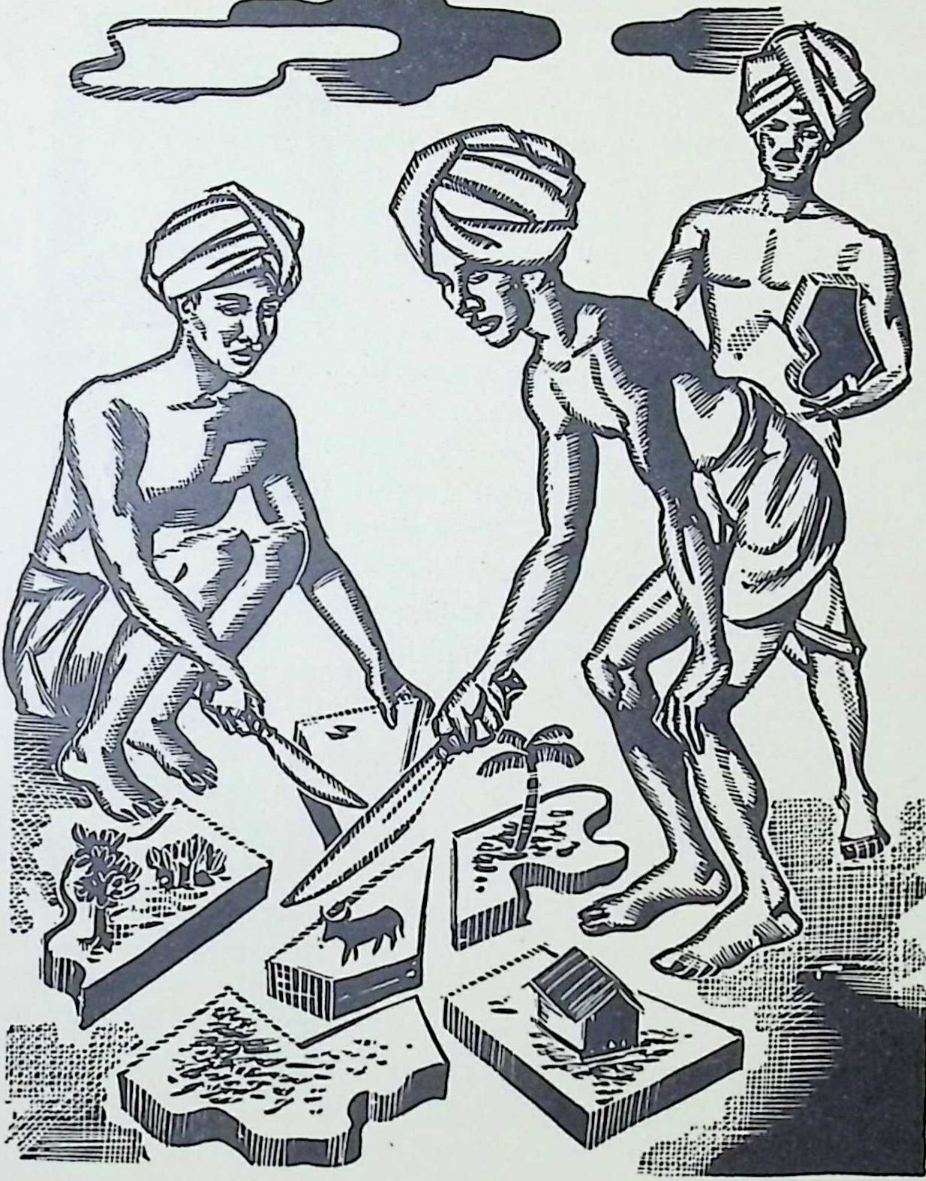


'mingling-mangling'. So far has this sort of thing gone that some people have tried to divide not only a tree but even its fruit and its branches!

All this means a big waste of man-power and cattle-power. It leaves Rama idle with nothing to do for four months in the year. The bullocks too are not used as much as they could be. Since the land is cut up into little strips, it is too expensive to put fencing round all the fragments, so straying cattle walk over it and damage the crops. Besides, how can you afford to buy and use tractors and other big machines for such small farms? Even if water is available, how can it be taken to all the little bits of your land without making canals through other people's fields? That leads to quarrels between neighbours.



Now, it has been found that a cultivator like Rama with a family of five and with two bullocks could put himself and his cattle to the best use on a farm 20 acres big. That is as much land as he could manage properly with the help of two or three labourers employed during the busy season.



That would give Rama five times as much as his farm does at present. You see how much more money he would have left for spending on buying good seed and wood for fuel and new instruments for tilling.



Is there any way in which we can give Rama another 16 acres of land? Well, why not? One way would be to take it away from some neighbours of his. This has been done in other countries, and farms of a reasonable size established. But what are those whose lands are taken away from them to do? In other countries, they would find work in a factory in some town or city. But in India there are so few factories. There are, of course, 150 million acres of cultivable land which is lying waste. Even if they were all brought under the plough, however,

they would only give an extra acre to each cultivator. And meanwhile?

Meanwhile, the only thing for Rama and his neighbours to do is to get together, pull down the fences that divide their fields, and cultivate all the land together, as if they were partners.

Suppose each of Rama's four neighbours has also 4 acres of land, then they would have 20 acres between them. How much would they get from the land? 'Five times as much as Rama gets now,' you will say. Wrong! Don't you see that when five men work together, our old friend Division of Labour appears on the scene? Rama and his partners discover that some of them are specially clever at a certain job while others are better at other kinds of work. On their own little farms, they had to be 'Jacks of all trades and masters of none'. But now, each can concentrate on one kind of work. And so the land will grow not five but six or seven times as much.

Then again, they don't need more than one pair of bullocks, so they can sell four pairs between them. That will save them money for feeding all those cattle, and with the price they get they can buy some machinery or perhaps the best of manures. And this in turn will improve the land. So you see that sometimes—but *just* sometimes—$4 \times 5 = 30$! You will find that this is so whenever there is co-operation, that is, whenever several people join

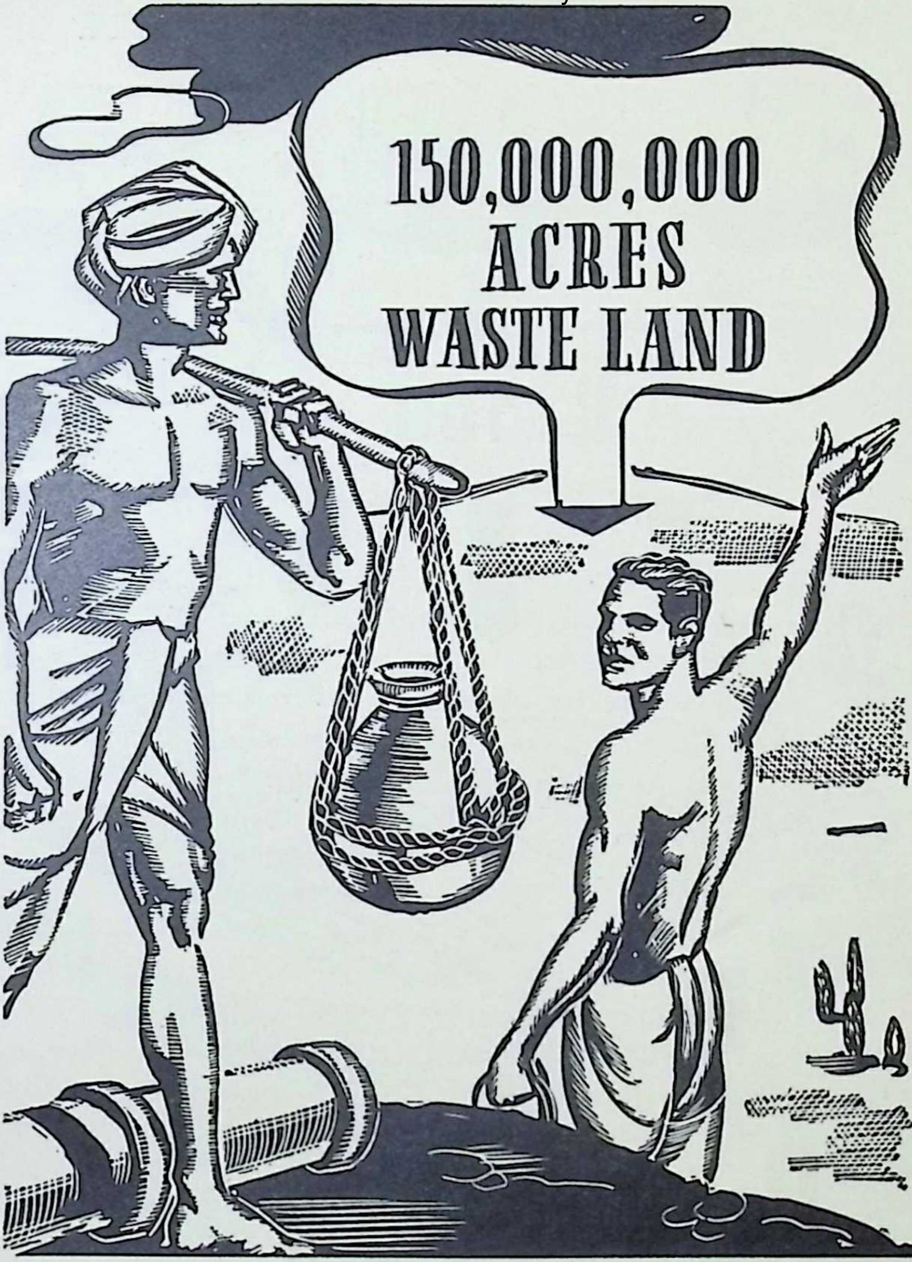
hands to do a thing. Then, everyone is better off. This has been done here and there in India already, especially in the Punjab, and wonderful results have followed. What is required are Collective Farming Societies all over the country.

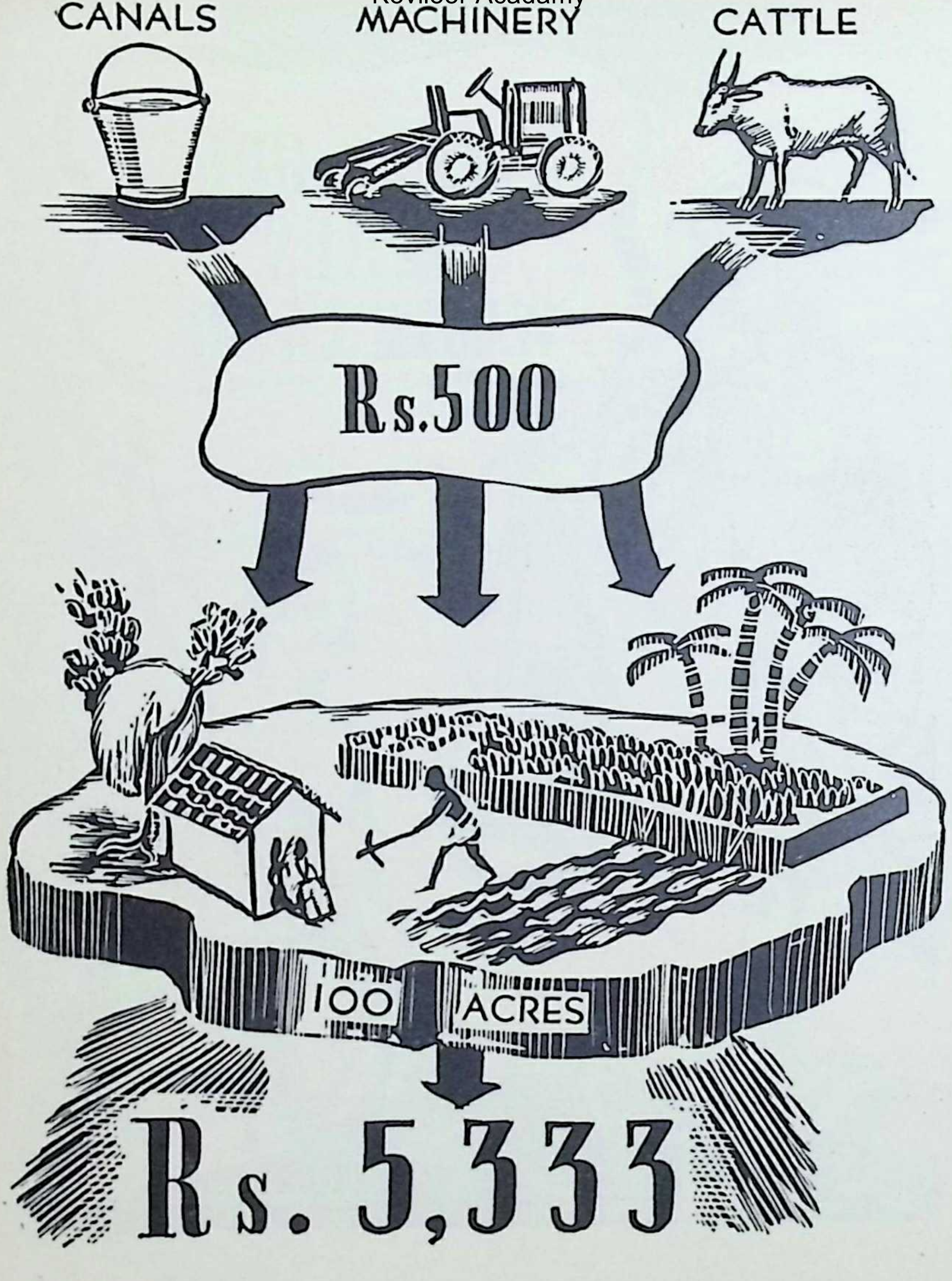
A start could well be made with all that land which can be cultivated, but which is today lying waste—at least 150 million acres of it.

It is naturally rather poor land—or it would not be lying unused. Even so, if it was divided into farms of 100 acres each, and four cultivators and their families were settled on it and Rs. 500 spent on each such farm in reclaiming the land, providing it with canals to bring water, and roads to go to market, and buying machinery and cattle, it is said it will produce food and raw materials worth Rs. 800 crores every year after the first ten years, which would be two-thirds of today's production from all the land in India.

That would be grand. All the same, we can't leave the better part of our land—and the best of it—to be cultivated as it is at present, can we? The trouble is that though co-operative farming is sensible, most of our farmers are not. Which is why the Government must step in and make them form big enough farms.

In Germany, Hitler's Government passed a law which said that each farm must be large enough to give a family enough food, clothes and all the things


150,000,000
ACRES
WASTE LAND


CANALS
MACHINERY
CATTLE
Rs.500
100 ACRES
Rs. 5,333

they need. The law also prevented farms from being too big, thus stopping one man from buying up too much land and driving others from the land. The farms created by this law cannot be broken up and divided, nor sublet nor pledged to money-lenders in return for loans.

In Soviet Russia, they have gone much further in scientific agriculture. They have formed big Collective Farms, with hundreds of people working on them. The biggest of them, called Gigant, is really gigantic. It is the biggest wheat-producing estate in the world—fifty miles from north to south and forty miles from east to west, with 17,000 people working on it. There is a huge harvesting machine used there, which reaps, threshes and winnows. One man can work that machine, which does as much work as a hundred men working with hand implements. This is something new in the world's history—a large factory without walls or roof! It is a marvellous change because before the Russian Revolution of 1919 the peasants of Russia used to cultivate miserable little strips of land just as our peasants do today and were as poor as ours still are. Like Hop o' my Thumb, they have since marched ahead in Seven-League Boots, leaving us far



behind. The 'Iron Horse', as the tractor is called, has become the Russian peasant's best friend.

I flew in an aeroplane some thousands of miles over Russia when I was there in 1935 and I noticed how different the land looked from what it does in England or France or India. In these countries, the land looks like a jigsaw puzzle, cut up into an odd assortment of strips and pieces of all shapes and sizes. The Russian landscape was like a chess-board, where the fields were the big squares and the houses or haystacks were the pawns.

I visited a village in the Armenian Soviet Republic which had in the last ten years changed over from old-fashioned farming to collective farming. It was a small village named Parakkar, with 250 families working together. The result was that the production of cotton had gone up from 240 kilograms per acre to 640 kilograms. A peasant to whom I talked now earned 500 roubles a month as his share from the collective farm. In the old days when he tilled his own little strip of land he used to make 150 roubles a month.

I have no doubt we can work similar miracles in India if we do some of the things we have talked about here. Just five big jobs to do—and we can get as much out of our land as the English do from theirs and build, not a house of cards, but one that will endure.

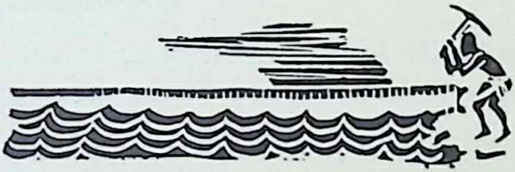
What are those five big jobs?

CO-OPERATIVE FARMING



(1) Divide the land over again into big enough farms—not smaller than 20 acres each, and encourage those cultivating land in use today to co-operate with their neighbours in collective farming. Set up big collective farms of 100 acres on land which is today lying waste.

CANALS



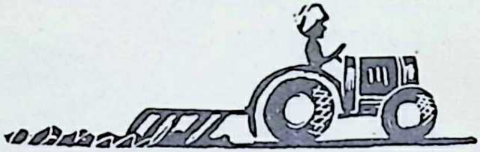
(2) Build more canals and wells, so that not one-fifth but *all* our land is irrigated.

AFFORESTATION & MANURING



(3) Look after our forests, and get wood out of them to use as fuel, so that cowdung can be used as manure along with other fertilizers.

MACHINERY



(4) Teach our peasants to use modern implements.

CATTLE



(5) Reduce the number of our starved and useless cattle and feed well those that we keep.

Do this, and we transform the face of India and make it smile. But one job must be done first to make all this possible. We must find some work to do for the extra peasants whom we shall have to turn off the farms.

VIII

WOOL ON A TREE

'A plant which, instead of fruit, produces wool of a finer and better quality than that of sheep, of which the Indians make their cloth.' That is how the Greek historian Herodotus described two thousand years ago that magic growth, COTTON. A foreigner visiting India in those times described cotton in his surprise as a lamb, growing out of a plant and eating the plants round about it.

Recently when the ruins of an ancient Indian town were discovered at Mohenjo-Daro in Sind and were dug up to find out how people lived in those days, cotton cloths were found. That, we are told by those who know, was five thousand years ago! Which shows us that we were the first people to make use of cotton and gives us an idea how ancient is the Indian industry of making cloth out of cotton. Even today, it remains our biggest industry, which is why we shall deal with it in this chapter.

Indeed, right down the ages to the time of the East India Company, cloth made in India supplied the markets of Asia and Europe. Unequalled for beauty of surface and variety of texture, the work of India's weavers was prized the world over. The

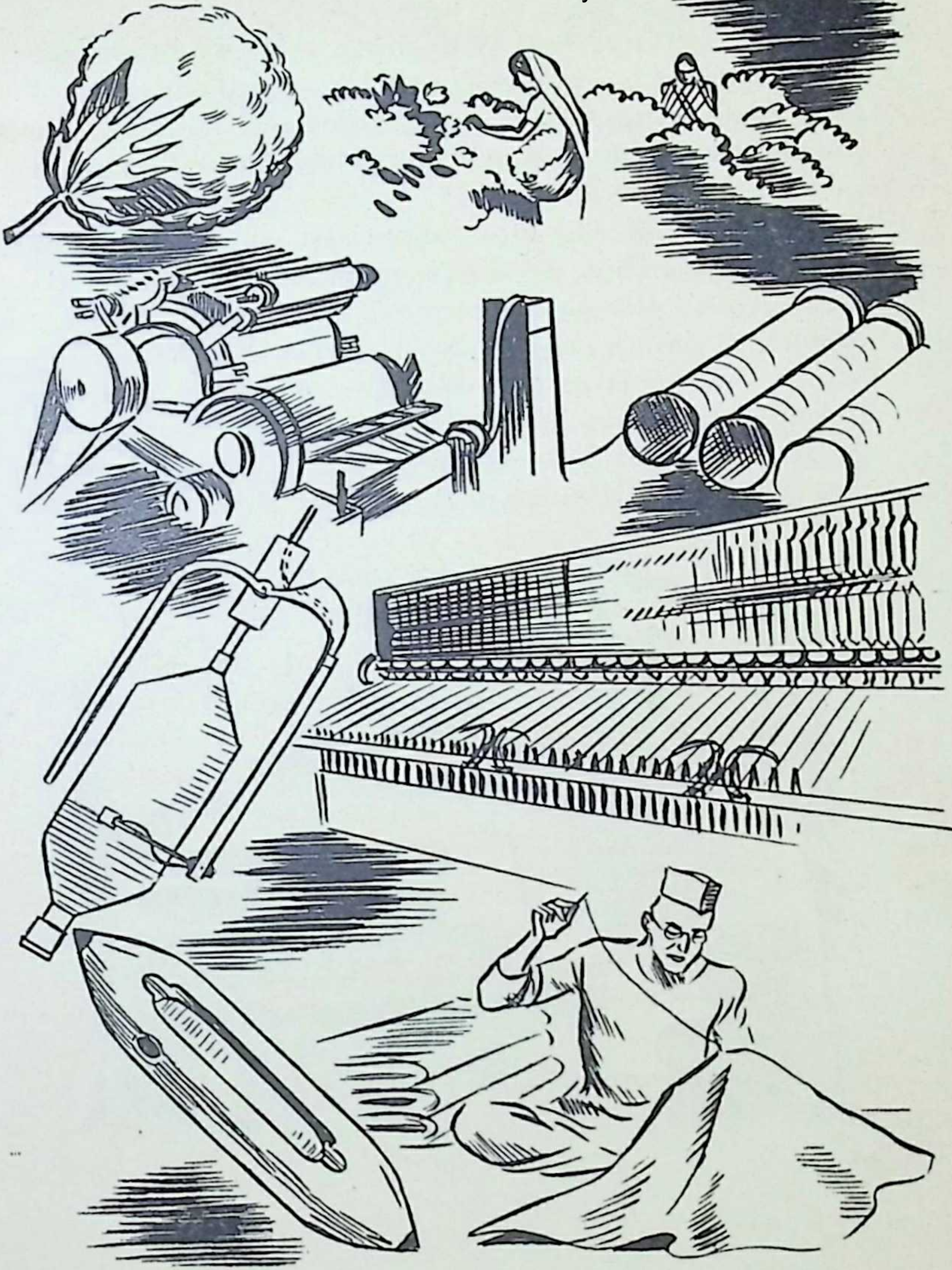
muslin of Dacca was compared to a spider's web for its fineness. It is said the Mogul Emperor Aurangzeb once rebuked his daughter for having so little clothing on her. The princess protested that she had wrapped the sari seven times round herself!

In 1701, the use of calicos (a name derived from Calicut) was prohibited by law in England because they were driving English cloth out of the market there. As late as 1815 India exported to England alone cloth worth £1,300,000 a year.

Then came the age of machine production, and the tide turned. Lancashire fabrics poured into India.

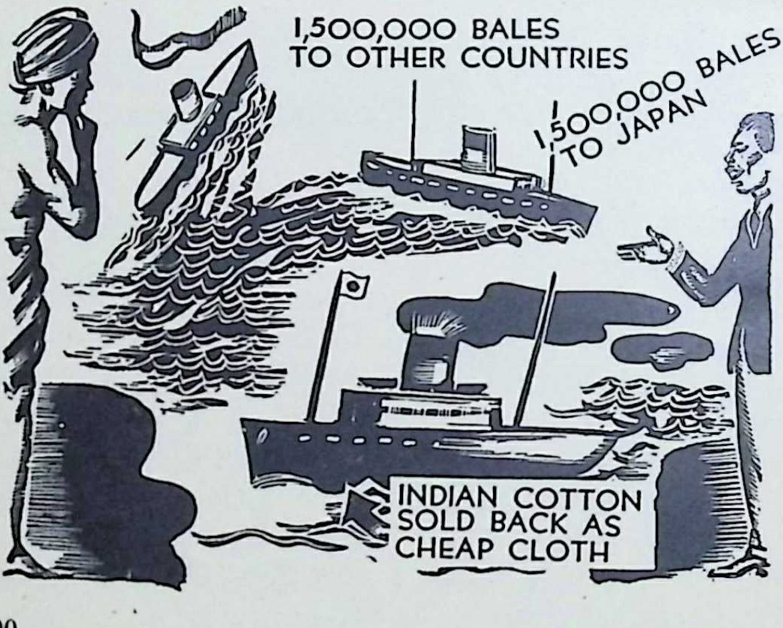
It was not till much later, in 1853, that the first modern textile (that is cloth-making) mill in India began work in Bombay. Today there are 69 mills in Bombay and 390 throughout India, employing in all some four lakhs of workers. The second biggest centre of cotton mills is Ahmedabad.

These mills supply every year 400 crores of yards of cotton cloth. But this is less than two-thirds of what the Indian people need—because India 'consumes' about 625 crores of yards in the year. The rest is provided in two ways. Some comes from small machines which weave cloth and which are worked by hand, called hand-looms. About 40 lakhs of persons work on these small hand machines and produce 150 crores of yards. From other countries, such as England and Japan, we buy 75 crores of yards of cloth.



That's funny, you will think. Why should we get cloth from other countries at all instead of manufacturing all we need, since our soil is, over large tracts, particularly suited to the cultivation of cotton crops?

You will be still more surprised when I tell you that it isn't that we don't grow enough cotton to produce all the cloth we need. Except in Bengal, Bihar, Assam and the North-West Frontier Province, cotton is grown over the entire length and breadth of India. We are, next to the United States of America, the biggest producers of raw cotton in the world, and we export no less than 3 million



bales of cotton, about half of our total crop, every year. Over half of that again is taken by Japan, our main rival in cloth manufacturing, to enable it to make cloth and ship it back to India for us to wear. And such is the slackness of our labourers, the inefficiency of our mill-owners, and so old and poor is the machinery in many of our mills that the Japanese are able to sell cloth made in Japan from our own cotton more cheaply than cloth made in Bombay or Ahmedabad!

On the other hand, with all that extra cotton on our hands, our mills actually import raw cotton from America, Egypt and Africa! This is done because Indian cotton is mostly of the kind called 'short-staple', while 'long-staple' cotton is necessary for making fine cloth.

Now, three things stick out a mile from all this. We export nearly half our raw cotton; we import a different variety of cotton; and we import an eighth of the cloth we wear. When you come to think of it, there's no reason why we should do *any* of these three things.

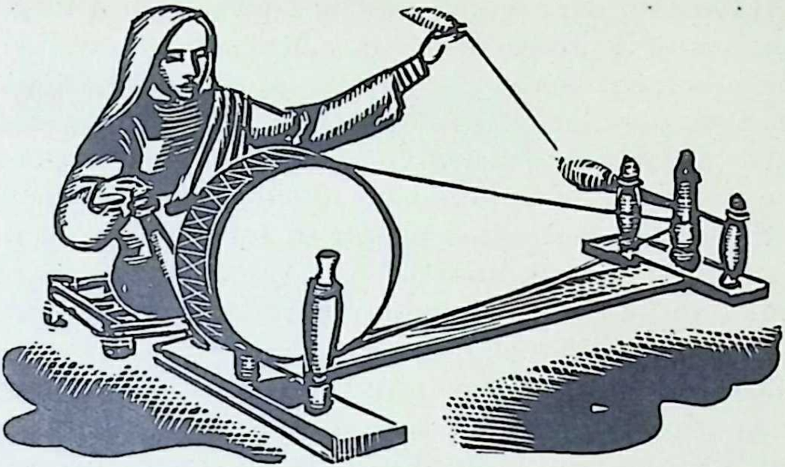
To start with, there's no reason why we should import any raw cotton. 'But we want long-staple cotton in order to make fine saris for our fine ladies,' say the mill-owners. Well, since beautiful ladies must, despite Mahatma Gandhi, have fine saris—let's *grow* such cotton. At present we grow too much short-staple cotton and too little long-staple

cotton. We have good soil available and we have the cultivators. All that needs to be done is to give them the right kind of seed and to help and encourage some of them to change over from the present varieties to the long-staple kinds. With that done, there would be no excuse for importing a single bale of cotton into India.

There still remains the import of cloth, principally from Lancashire and from Japan. It is not as heavy as it used to be—though it is still the largest single item in our imports. Already, Indian mill cloth and cloth woven by hand from yarn spun by hand (called *khaddar*) have largely displaced foreign cloth, but there is no reason why a single yard of foreign cloth should enter our country. Particularly is this so with things which can be made with short-staple cotton—like waterproof cloth, mosquito nets, socks, handkerchiefs and sewing thread.

As we have seen, our peasants are almost unemployed for about four months in the year. Hand-spinning and hand-weaving are occupations as good as any we can give them to keep them profitably occupied for those periods in the year when the land doesn't call to them.

If in the bulk of the homes of our cultivators there were a spinning-wheel (*charkha*) or a hand-loom on which they and their wives and their grown-up children could work in their leisure hours, they could



satisfy the market which at present invites foreign cloth.

Yes, you will tell me, that is splendid. But if we are not going to buy any cloth from England or Japan, why should these countries buy our extra cotton any longer?

That is quite a bright question, but one that need not worry us too much. A good bit of the cotton we at present export would, to start with, be absorbed in the process of increased manufacture of yarn by the spinning-wheel.

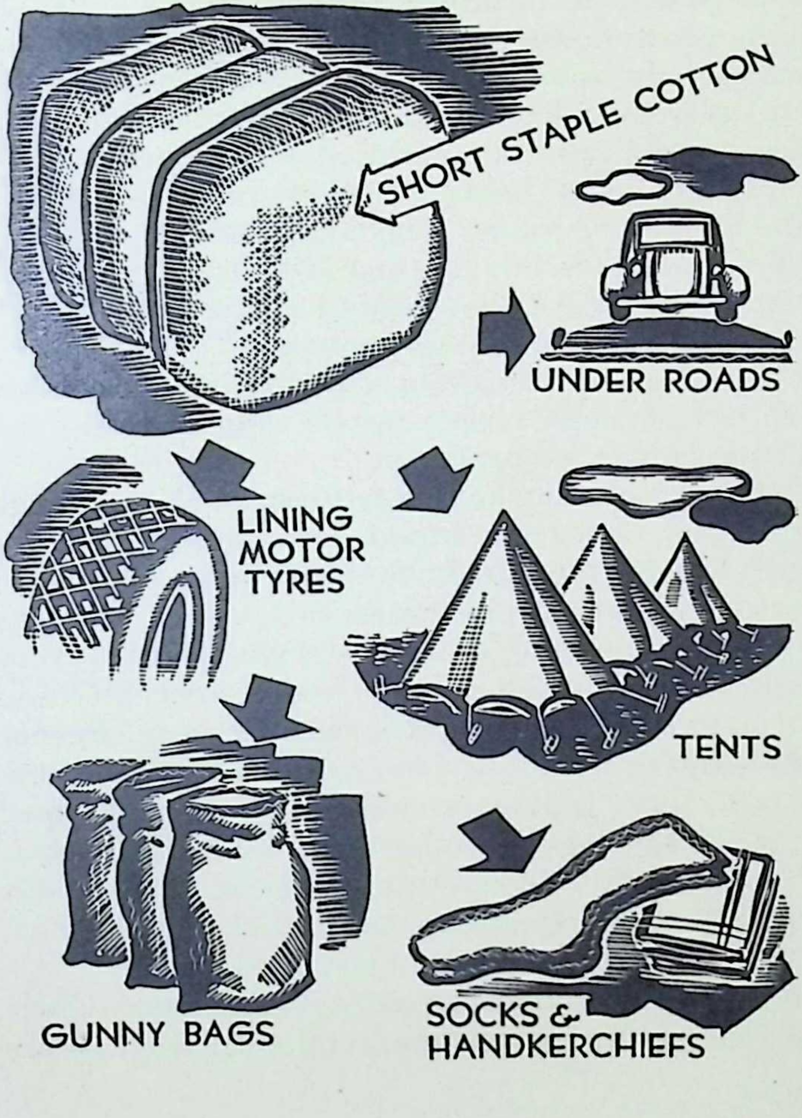
Supposing that no foreign country will need any of our cotton any more, that would leave some of our cotton on our hands, wouldn't it? The problem is—what shall we do with it? And a very simple problem it is to solve!

Have you ever asked yourself why such a large number of Indians dress like Mahatma Gandhi? The answer is that India's consumption of cloth per head of population is fantastically low—only $16\frac{1}{2}$ yards a year. And when you allow for the length of the women's saris, there isn't much left for the men, is there? In fact, most people in India go about in torn, shabby rags, and those in the colder parts of the country shiver in winter because they haven't any money with which to buy the clothes they need.

Now, supposing our peasant was a little more prosperous—and we've seen already how easily he can be—and could afford a little bigger wardrobe; or even supposing we're modest and only allow him to buy one more dhoti for himself and one more sari for his wife every year, can't you see all the mills in India working night-shifts and all the spinning-wheels whirring melodiously for all they are worth, consuming all the cotton they can find?

Besides, making cloth for wear is not the only use to which cotton can be put. All sorts of other uses have been, and can be, found for any we may have to spare. Cotton can be used for the lining of motor tyres. Under the surface of our roads, there are layers of various things which give the roads strength and springiness, and cotton can be used there.

Canvas which is waterproof has so far been made of flax. When war broke out in 1939 and flax


SHORT STAPLE COTTON
UNDER ROADS
LINING
MOTOR
TYRES
TENTS
GUNNY BAGS
SOCKS &
HANDKERCHIEFS

supplies were cut off, something else had to be found from which waterproof canvas could be made. Indian cotton was found to be that thing. England has already ordered Rs. 46 lakhs' worth of cotton canvas from India and millions of yards of this new article will now be produced. As I write this, experiments are being made to mix cotton with jute in making gunny bags and cloth for packing bales and other things which are at present made only of jute. All these things can, what is more, be made from short-staple cotton.

So let's not worry about who will buy our cotton. We have enough people in our country to use up all the cotton we produce.

If only some of the things we have talked about could be done, we would stop sending money out of India for buying foreign cloth and foreign cotton, we would give work to lakhs of peasants who have nothing to do for four months every year, and we would be able to dress decently and attractively, as men and women dress in Europe and America. Then, our picture of the ordinary Indian would change from this to something like this.





We have talked about the textile industry in this chapter, because it is our oldest and biggest industry. The problems that face us in making our cloth are the

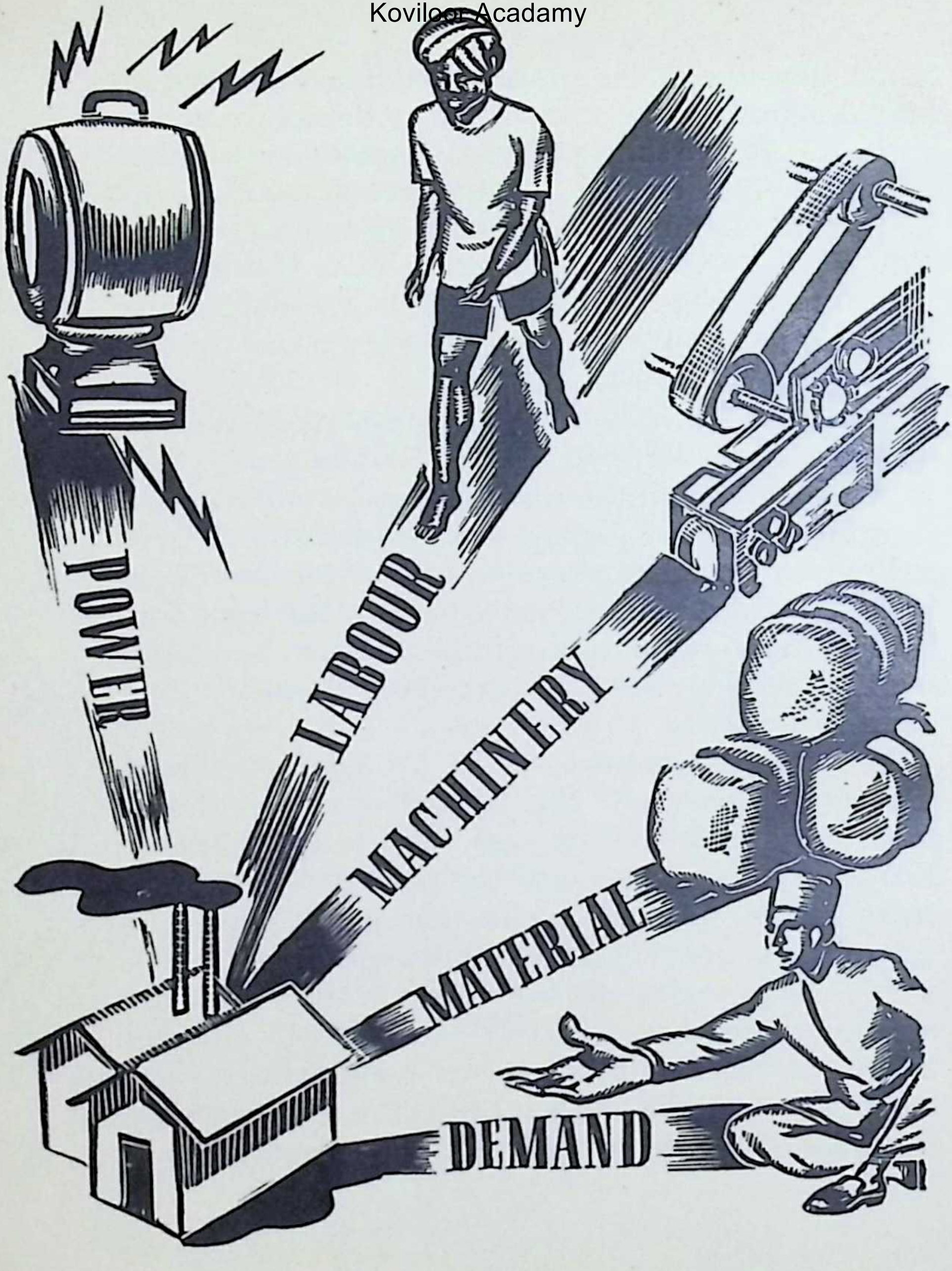
same, however, as the problems that face us when we try to manufacture so many other things we need.

There are five things that any big factory, whether it makes cloth or shoes or matches or motor-cars, needs. There must first of all be people to buy the things that are made in it—that is, a MARKET for the goods. The huge population of India, doing without most of the needs of life, is one of the biggest markets in the world.

There must then be available the RAW MATERIALS for making the finished article. We have seen that we have almost all the raw materials a country can possibly need, and plenty of most of them.

Next, we need workers to toil in the factory—LABOUR. That need is easily met by the huge surplus population of our villages, which is simply waiting to pour into factories the moment they open their gates.

Two things remain to make a busy, prosperous industry. These are MACHINERY to make things plentifully and fast enough, and some form of POWER with which to feed the machines and make them move. We saw, for instance, that while our cotton mills are mostly situated in Western India, where cheap hydro-electric power is to be had, the machinery in these mills is often rather old and inferior. That is because we make hardly any machinery in India and have to get machines all the way from Europe or America, which makes them


POWER
LABOUR
MACHINERY
MATERIAL
DEMAND

very expensive. So we put off getting new and up-to-date machines and carry on with out-of-date ones.

Since a country like India must do without so many things its people need unless it has big factories, and since we cannot work a factory without Machinery and Power, let us now set out on a little expedition to discover where we can find these twin giants and how we can set them to work for us. It will be an exciting expedition for you because it will take you where I am almost sure you have never been before—underground.

IX

OUR BURIED TREASURES

Nowadays, people keep their most precious possessions in steel safes or leave them for safety in the strong-rooms of their banks. In the old days, however, before banks and strong-rooms came into existence, people who wanted to keep safe anything they treasured dug up the ground when nobody was looking and buried the stuff. Then, when they needed it again, they dug it out.

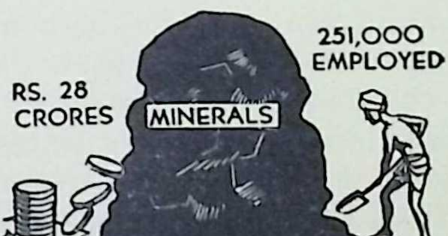
As in many other ways, Man was here—perhaps without knowing it—only imitating Nature. For, long before Man emerged, Nature had hidden underground the most precious of her products. Thousands of years later, when Man was groping in the darkness of his own ignorance for means with which to raise himself from the level of the beasts, he blundered—now here, now there—upon those hidden treasures. At first he blinked with wonder and bewilderment, but sooner or later he found out ways of making use of what he discovered—whether it was glittering and beautiful like gold and diamonds, or dull and grim like iron and coal, or fluid like petroleum.

These things, which are neither animals nor vegetables, are called MINERALS, and their beds below the surface of the earth are called MINES. For us their special importance is that it is out of some of these minerals that machinery can be made and power generated.

Now Nature has not distributed her favours at all evenly. The result is that the people occupying certain parts of the Earth's surface find themselves presented with wonderful buried treasures while others dig and dig in vain.

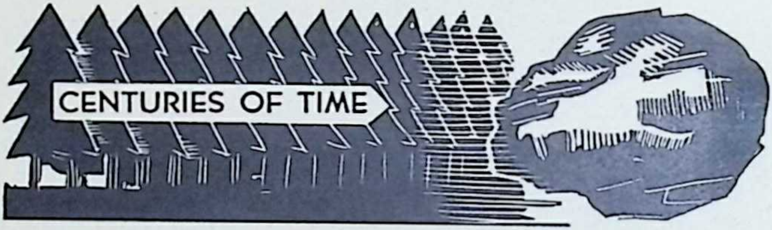
On what sort of plot of land have we Indians managed to build our homes? I should say we have not done at all badly. Out of the taming of coal, iron and other metals we already make Rs. 28 crores every year, and 251,000 Indians are kept busy at the job. But that is nothing to what we could do, for our underground stocks put us in as strong a position as the leading industrial countries of the world. We have managed to step on to a rich inheritance of buried treasure, which we shall now proceed to explore.

Perhaps we had better start with our friend Old King Coal. A coal mine is sometimes called a cemetery, which is the name for a place



where people are buried when they die. But what is buried in a mine?

No, not coal, though that is what you find there today. Thousands of years ago what got buried there was swamp grass, and plants of all kinds—sometimes whole forests. And there they lay, rotting below layers of sand and clay and rock, becoming harder and harder and blacker and blacker every century, till we started coming across them and called what we found there coal.



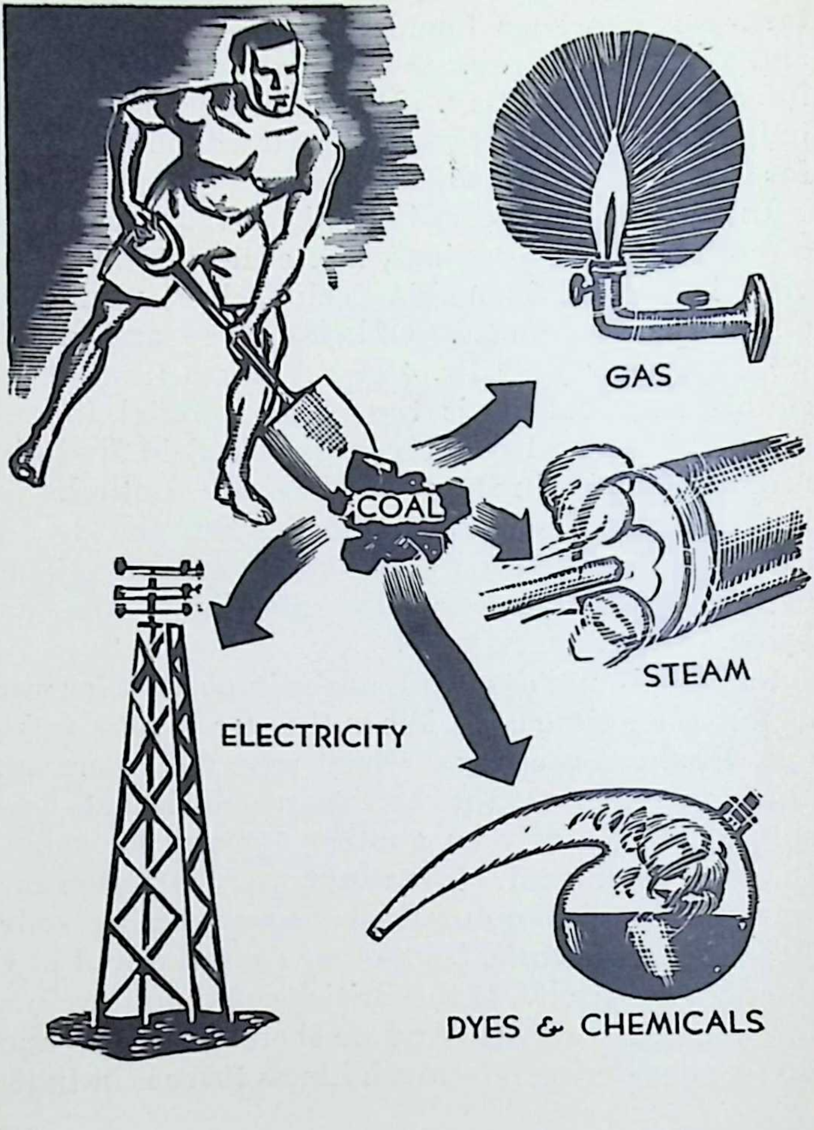
Coal has also been described sometimes as the Black Diamond. Why this comparison with such a rare and precious stone? Because both, though so unlike to look at, consist of carbon. Also, to give an idea of the value of coal. Actually, it is much more valuable than diamonds, for it can be put to so many wonderful uses.

Coal started its career by being one kind of fuel, which is the name for things one burns in order to get fire and heat. It was a fuel superior to wood. Then gas and electricity came along and, both for heating and cooking, elbowed coal out of its position

as a fuel. By that time, however, two more important jobs had been found for coal—making steam and electrical energy. As we shall see later, that is its chief work today. It looks, however, as if, before many more years pass, coal will only be used for something quite different.

In the last few years it has been found that out of coal can be got things, like coal-tar, which are very important in making colour-dyes, medicines and other chemicals. Of such dyes and drugs we buy every year Rs. 4 crores worth from other countries. Coal-tar is the basic material for all these things, and coal-tar is produced in India in large quantities in Bengal and Bihar. But a lot of it is just thrown away. In the Jharia coalfields, for instance, it is believed that some 30 million gallons of tar—rich in motor spirit and light oils—are being wasted every year!

Chemicals and dye-stuffs are as important for war as for peace-time use. When the war of 1914 broke out, England used dyes which were 90% German. During that war, the British people learnt how silly it was to rely on another country for something so important. The result was that when the war of 1939 broke out England was getting only 10% of its dye-stuffs from other countries and producing 90% itself. If the British could do that in a few years, so can we. And we should hurry up and do so, considering how much illness there is in India

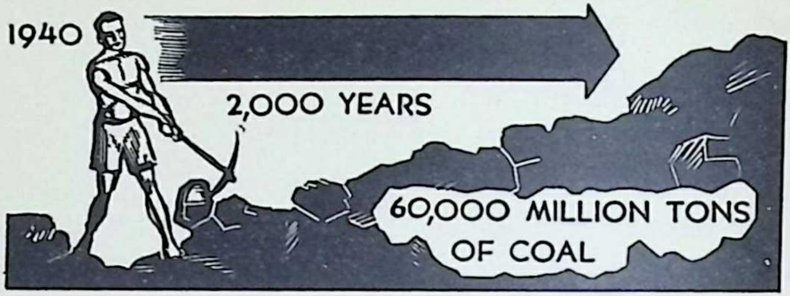

GAS
COAL
STEAM
ELECTRICITY
DYES & CHEMICALS

for which we need drugs and how much cloth we make in India for which we require dyes. In fact, there are people who tell us that coal is so very valuable for making dyes and drugs that it is a pity that we should waste our coal by burning it in kitchens and fireplaces and railway engines.



How much have we of this most important mineral? We have, since the beginning of this century, become a more and more important coal-producing country, and today we stand ninth in the world. Every year, 162,000 people in India dig out 25 million tons, almost nine-tenths of which are got from coalfields in Bengal and Bihar which, as we shall see, are very lucky provinces where things underground are concerned.

The coal we actually get, however, is nothing to what still lies untouched in our mines. Great quantities are believed to lie hidden under the hills of the Deccan in the south, and recently coal has been discovered in the State of Kashmir far away in the north. It is said that we have 60,000 million



tons of coal under our soil. This means that if we were to go on digging at the rate we are doing, we could go on doing so for over 2,000 years!

As important as coal are various ores which we get from under the surface of our land. An ore is the natural mineral which contains a quantity of metal. This metal is extracted from the ore by heating and melting it and separating the metal from it. Different ores contain different kinds of metals, and some of these metals, like iron and manganese and chromite, are what machines are made of.

Perhaps the ore we need most to worry about is iron ore, the crude substance from which iron is obtained, and iron is what steel is made from. Later, we shall see the wonderful purposes to which iron and steel are put. It is worth while remembering that in the modern world no country can hope to survive which is not able to produce or get enough iron and steel.

Most of the iron in India comes, like coal, from deposits in Bihar and Bengal. As with coal, how-

ever, so with iron, we are using only a very small part of the iron that lies buried under our land. In Northern and Central India, we have some of the largest deposits of iron in the world. It is said they contain 3,000 million tons of iron. What's even more marvellous, they are not only among the largest, but also the richest. The quality of some of our iron is the finest that Nature has given any country.

In spite of our wealth, however, we actually extract very little iron compared to other countries, as you can see from the picture on page 24. And we again stand ninth in the world, though we could be first.

Another very important metal, as we shall see a little later, is manganese. Of manganese ore we are, next to Soviet Russia, the world's biggest producers. Our reserves are *the* biggest in the world. In 1937 we produced ore, more than half of it in the Central Provinces, containing 534,000 tons of manganese. If you look at the picture on page 25 you will get an idea how big a share it is of the world's supply.

What do we do with it all? Do we extract the manganese from the ore, and make fine steel out of it by mixing it with iron? Or do we powder it and use it for bleaching things, that is, making them white? Or do we make strong disinfectants out of it? Or do we use it as a colouring material for glass? No. We *could* do these things, but we

don't. We leave all that to others! We content ourselves with shipping away to Europe, America and Japan almost all the ore we dig out. And we are sending out more and more of it—fifteen times as much now as in 1914.

And that, sad to say, is what we do with most of our wonderful underground treasures. We neglect and leave untouched what other countries do not want. And what they do want, we sell to them. This is even worse, for when in future we grow wiser, and want to make use of these things, there will be little left for us! What's most stupid of all is that we sell these things at half the real price!

For instance, if we extracted manganese from ore and then sent it abroad, we would get a good price for it in London or New York. What we do instead is to send the ore as we find it. So we have to pay for the cost of carrying all the way to Europe or America the useless stuff as well as the manganese! That is because we are too lazy to set up works in India where we can get at least the metal out of the ore. And as with manganese, so it is with other ores also.

Mica is another mineral with which we are splendidly supplied. Once again, we have the world's finest deposits of a substance which is very important for use in a war, which insulates electric current and stops us from getting shocks, and which can sometimes take the place of glass. Even

though we still don't touch most of our mica, we produce two-thirds of the world's supply, mostly again in Bihar. But as with everything else, we ship almost all of it to England and America.

Other metals we have—though we are not so well stocked in them—are copper, of which are made the wires which carry electricity through the country; tin, which carries to us biscuits and fruits and other nice things to eat; aluminium, which because of its lightness and strength we use for making kitchen utensils, electric fittings and aeroplanes; chromite, bricks of which are used for lining the furnaces in steel works; gold and silver, of which are made our coins. In the sands round Cape Comorin, our southern extremity, are to be found ilmenite, for the manufacture of paints, and monazite for making lamp mantles. Over the page you can see some of the things which are made from our minerals.

But don't think that all minerals are metals, will you? There are also, as we saw earlier, various salts in the earth. There is, for instance, saltpetre, also called nitre, to be found mostly in Bihar. It contains nitrates and was used in the old days for making gunpowder and explosives. Now, artificial nitrates are used for that purpose, so saltpetre can be used for putting back in the soil as a fertilizer. Don't forget that the land needs nitrogen. We have underground stocks of phosphates too, though not



enough. I wish we had more, for they make a fine manure.

And then, we have a little of that wonderful liquid mineral, petroleum, which is such an important source of power that countries go to war in order to get hold of oilfields. We had quite a lot of it in



Burma—until, alas! Burma was separated from India. Now we have just a little left in Assam. But they say there may be lots of it in Baluchistan, in the North-West Frontier Province and in the Punjab. As I write, they are starting work on a big oilfield that has been discovered near the town

of Jhelum in the Punjab and which extends right to the borders of Kashmir State. It is beautifully placed, with a railway line and a big road called the Grand Trunk Road running right through it, so that the oil can be easily carried to different parts of India.

I almost forgot to mention a mineral which is like a key to the metal and chemical industries—sulphur. To tell you only a few of its uses—sulphur is a great disinfectant and is used for skin troubles; it is essential to make rubber strong; farmers use it for killing insects; paper products and wood are soaked in liquid sulphur to give them strength and endurance; mixed in oil, sulphur is



used for cutting metals. It is mixed in cement to fix metal in stone when building houses. It can bleach—that is, make white—straw and cane furniture, and is used for tanning leather. Apart from all this, it is very important in the making of chemical substances.

Sulphur in its natural condition is found in pyrites, which we find here and there all over India, though not in big enough quantities for preparing sulphuric acid for ourselves. This is rather sad, because in England the supply of cheap sulphuric acid—the price of which was brought down from £30 to £2 a ton in a generation—has been the foundation on which the whole chemical industry is built. British chemicals and drugs then invaded India and destroyed what little we were doing in the way of producing alum and nitrates. So now we have to pay £20 million every year as the price of things we buy from Europe *made from minerals which are available in India but lying idle.*

We have seen that while all round we are rich in minerals and can be the richest in the world in iron, manganese and mica, our weak spots are petrol and sulphur. But one can't have *everything*, can one? It only means we have to find ways of adding to our present supplies. For instance, news came recently that pyrites had been discovered at Simla, at Shahabad in Bihar, and at Ratnagiri in Bombay. Or here's another idea. In extracting copper in

Bihar, it is said 20 tons of sulphur dioxide gas escape into the air every day during the process of roasting the copper ore. In other countries, this gas is not allowed to escape. In Canada and in Finland, they convert it into sulphur. So could we.

Besides, really, *do* we know what lies beneath our land? The fact is we have been so awfully lazy that we have not even bothered to find out what lies in our buried treasure chests. There are some officials of the Government whose job it is to burrow under the soil and find out what it contains. Every year they go on an expedition to a particular district. But there are so few of them that, till now, they have examined only a fraction of our land. What do we know about what is in the rest?

And so, if you read the newspapers, you will find one morning that suddenly 80 million tons of coal and 610 million tons of iron ore have been discovered in the Assam region. Another day, your paper tells you that a large quantity of magnetite—magnetic iron ore, which is very important—has been located near Daltonganj in Bihar. These Biharis do seem to have all the luck, don't they?





X

POWER

In the old, old days when man was still a young animal, he used to do everything with his own hands as other animals still do. But soon—that is, after a few hundreds of centuries!—he began to make crude instruments out of wood and stone and metal to help him in cutting or breaking or lifting things. Always, these instruments were moved by the strength of man's own arms and legs. A little later, man found out that he could make use of other animals to do these things for him. So he tamed and harnessed the bull, the horse, the elephant and the dog and made them do the heaviest part of his work. Man also discovered that he could use the force of the wind and the current of the stream and of the tides of the sea for propelling his boat or ship. But the rest, all the unpleasant work of breaking stones, cutting trees and carrying

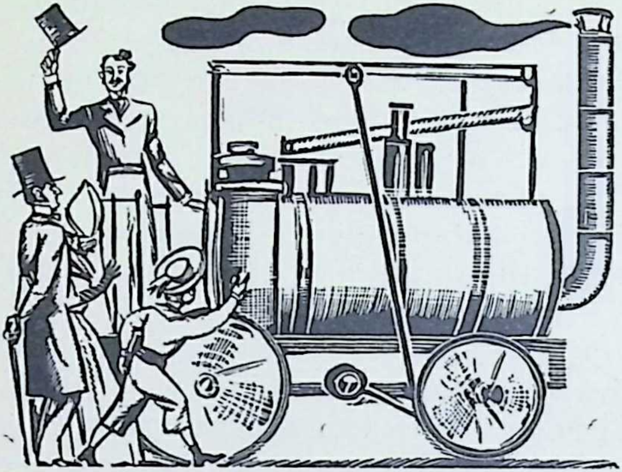
things, was done by animals or by men who were slaves of other men. And this remained so for many thousands of years.

Only a hundred years ago in India houses were built, boats were propelled and people were carried in the same way as they were thousands and thousands of years back when our wild ancestors came and settled in India. It took a man as long to get from Patna to Delhi in 1800 A.D. as it did in the days of Asoka or Chandragupta.

For quite a long time philosophers in various countries kept on trying to discover some power which could act as Prime Mover for all instruments. Man groped for something to feed the instruments of work, of conveyance and of war with, something that should do what bread did for men. For what is bread but an amount of energy—so much power for a man's brain, his back, his hands and his feet? Such a force would save men from much of their toil. You find that Leonardo da Vinci, the great Italian painter of the fifteenth century, was also one of these searchers. In the sixteenth and seventeenth centuries clever men kept on trying and, as in a game of hide-and-seek, they got 'hotter and hotter' on the trail.

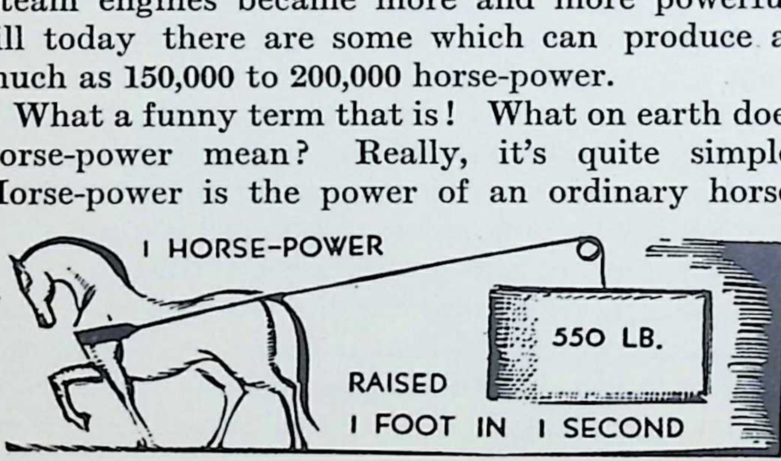
At last, in 1768 came the discovery of the steam engine. It was found that if water was boiled and the steam collected and imprisoned in a cylinder, its force would be strong enough to move things. So

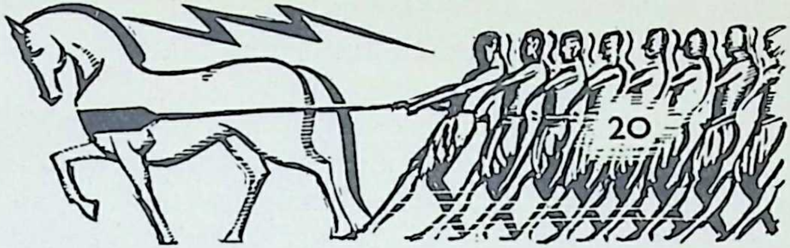
there came the 'Puffing Billy', the first railway



engine, where the steam drove the piston, making the wheels turn. There followed steam-ships, and machines in factories for making various articles. Steam engines became more and more powerful, till today there are some which can produce as much as 150,000 to 200,000 horse-power.

What a funny term that is! What on earth does horse-power mean? Really, it's quite simple. Horse-power is the power of an ordinary horse.





They say horse-power is something like 20 times man-power. So when I say that a steam engine possesses 50,000 horse-power, it means it can pull or push as hard as 50,000 horses or 1,000,000 men. What a tremendous achievement that is! Man has found one million new servants, all in one steam engine! Fancy having to feed a million men! But you don't have to. All you need to feed a steam boiler on is some water and some coal.

But man was not satisfied with this miracle he had worked. There is in man a spark of what has been called 'divine discontent'. This spark burned —and round about 1880 it produced the oil engine. In an oil engine, instead of imprisoning steam, you imprison a mixture of oil and air in the cylinder. Then you light it, and pop! it explodes with tremendous force and knocks the piston back.

More powerful and cheaper than the steam engine, the oil engine started taking its place. Steam is still competing with oil in working factories, pumping water, propelling ships and generating electricity, but all the time oil is beating steam.

Just as steam made the railway and the steamship possible, so the oil engine has made possible the motor-car and the aeroplane.

But what does man do now? His restless mind looks round once again for some yet more wonderful source of energy. Quite wisely too, for man always seems to be able to use more power, but there are only limited stocks of the fuels which can give power.

So man turns back again to that old friend of his infancy, Water. Now that he has conquered the metals and made big wheels and long wires, he finds it to be a real giant. So we come to our own times and approach the end of 'the age of fossil power'. A fossil is something very ancient preserved underground, like coal or oil. Which is why the Bright Young Things of today sometimes refer to their parents as 'dear old fossils'!

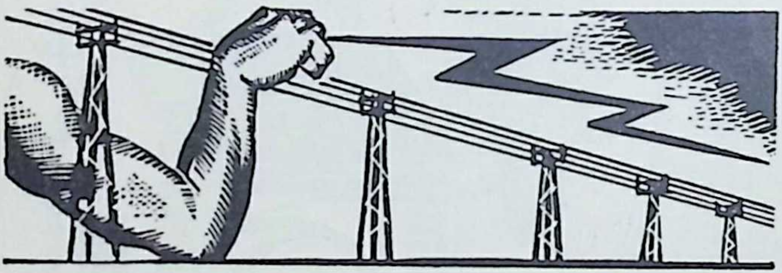
How is the Water giant tamed? Water flows down the side of mountains in waterfalls and forms rivers. If it can be caught at the foot of the fall, it has the terrific force of water in motion. The same sort of power can be captured by storing water in a reservoir at the top of a hill and then sending it gushing down big iron pipes to the bottom of the hill. There it can be made to turn huge waterwheels called turbines. The turbine turns dynamos, and the dynamos produce electric power. This power (or current) can be carried along wires to set



other smaller dynamos turning, and they can lift and move things and do all that coal and oil have done. Not only water-power, but coal and oil too can generate electricity. But coal and oil can get exhausted, while 'so long as the world spins and the sun shines and the rain falls', there is no end to the supply of water-power.

Apart from being inexhaustible and at some places cheaper than coal or oil, electricity has another advantage: it can be carried by wires for great distances. Today, it can be conveyed two or three hundred miles. Current from the Niagara Falls in America goes 450 miles to New York. So now it is only unattached things like ships, motor-cars and aeroplanes that still need to rely on coal or oil.

India has, like the rest of the world, passed through the various stages of the conquest of Power, though later than most other countries. We are just entering the age of electricity. As you travel through the country by train or car, you see steel masts, with four legs and many arms, dotting



our countryside. Each of those arms grasps copper wires which carry electric current.

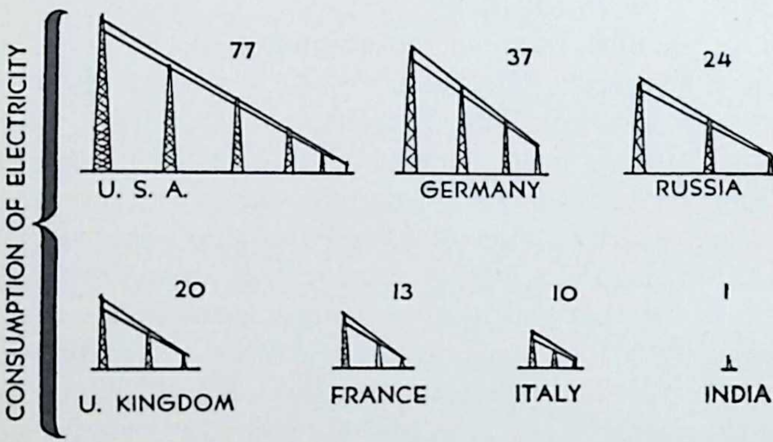
About a third of this current is provided by water-power. In the provinces of Bombay and Madras, there are large water-power (hydro-electric) stations. The biggest is in Bombay, where the big business firm of Tatas have built reservoirs at the top of the Western Ghats. From those reservoirs the water is sent 1,600 feet down pipes to the foot of the hills, where 230,000 horse-power of electricity is generated. It is with this power that the city of Bombay is lighted, that 53 of its 69 cotton mills work, that its trams run, and that trains are pulled from Bombay to Poona on one side and to Igatpuri on the other.

The second biggest water-power centre is that which harnesses the falls on the Cauvery river in Southern India. This current works, among other things, the big gold mines at Kolar in Mysore State.

The hydro-electric stations work on the grid system—that is, those near one another are grouped together, and through a network of wires they pool their power, thus supplementing one another's work. There are five such grids working in India—in Bombay, Madras and Mysore, the United Provinces, the Punjab, and the North-West Frontier Province—capable of supplying some 600,000 horse-power of electricity. Today we get from water-power fifteen times as much energy as we used to do in 1915.

Eastern India is not so well supplied with water-power, so coal is consumed there. Calcutta is lighted with electricity produced locally from coal, and so are the iron and steel works at Jamshedpur in Bihar. At present, two big stations using coal are being built in Bihar at Gaya and at Jamunia-tand, each meant to produce 20,000 horse-power of electric energy and forming a grid between them.

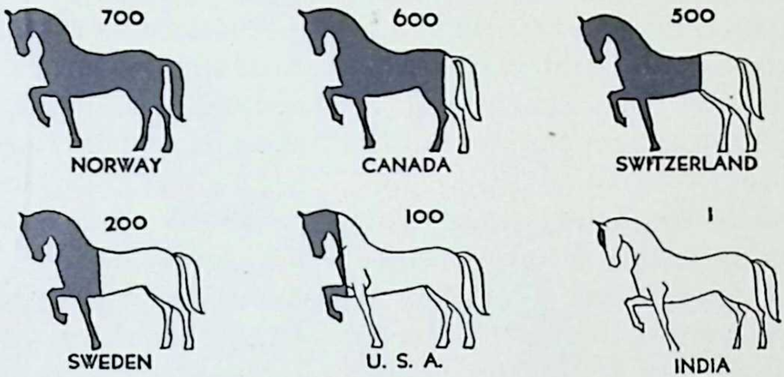
How much electricity do we use in all? It is believed that India uses something like 1,500,000 horse-power. Sounds a lot, perhaps, but it isn't really when you know how much other countries, even those which are much smaller, use. This picture gives you an idea.



Perhaps you will get a clearer idea of how far we lag behind others in this respect if I tell you that in Norway water-power alone provides 700 horse-

power of electricity for every 1,000 people, in Canada it gives 600 horse-power, in Switzerland 500 horse-power, in Sweden 200 horse-power, in the U. S. A. 100 horse-power—and in India? Just over one horse-power for every 1,000 people!

HORSE-POWER PER THOUSAND POPULATION



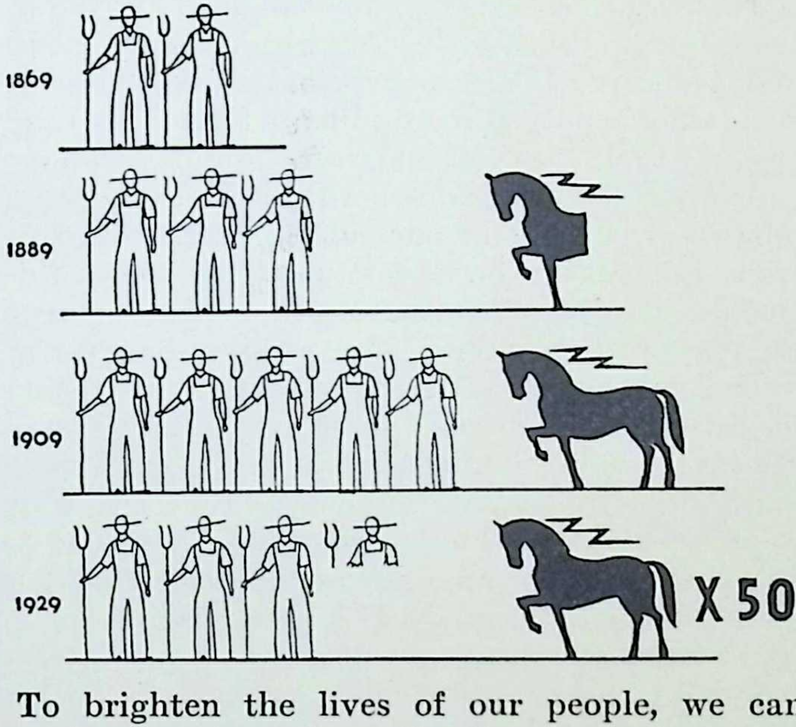
Makes us feel very small, doesn't it? But then, it's hardly surprising when you remember that we have such few factories, that almost all our trains, and there are not so many of them, are pulled by steam locomotives, that electric light is not known outside the big towns and that even in towns only a few people use telephones and radio sets. It is because we don't know how to make electricity serve us that we consume so little of it. Could we then get more power if we wanted? Couldn't we just! Not only more, but hundreds of times more power!

India has, next to Canada and the U. S. A., the finest resources of water-power in the whole world —something like 27 million horse-power as against Canada's 43 million horse-power and the United States' 35 million horse-power. And how much of it do you think we use at present? Less than a fiftieth! But while we use only a fiftieth of what we could, the United States use a third of what they could, and so do France and Japan. Germany utilizes over half, and Switzerland—these small peoples seem to have all the brains!—nearly three-fourths.

An English engineer who wrote many years ago a book called *Happy India* gave an even more rosy picture of our resources. He calculated our water-power like this. The length of the Himalayas and our other mountain ranges he put at 3,000 miles. One cubic foot of water falling 1,000 feet in one minute can generate, he said, 2 horse-power. From which he counted a total of 150 million horse-power from natural waterfalls and rivers alone. This of course is a very liberal estimate because all this flowing water cannot be stored and converted into electricity economically; but it goes to show the tremendous possibilities of our mountain ranges.

With such a wonderful ally in Nature, what can't we do? We can set up big factories to make the things we want for ourselves. We can carry electricity to the villages and not only light up the huts

of the peasants but teach them to use electric pumps for getting water and electric machines for grinding and crushing and threshing. This picture gives you an idea of how much electricity has come to be used for agriculture in the United States of America. Each man in the picture stands for one million people working on the land. Each horse means five million horse-power of electrical energy used by them.

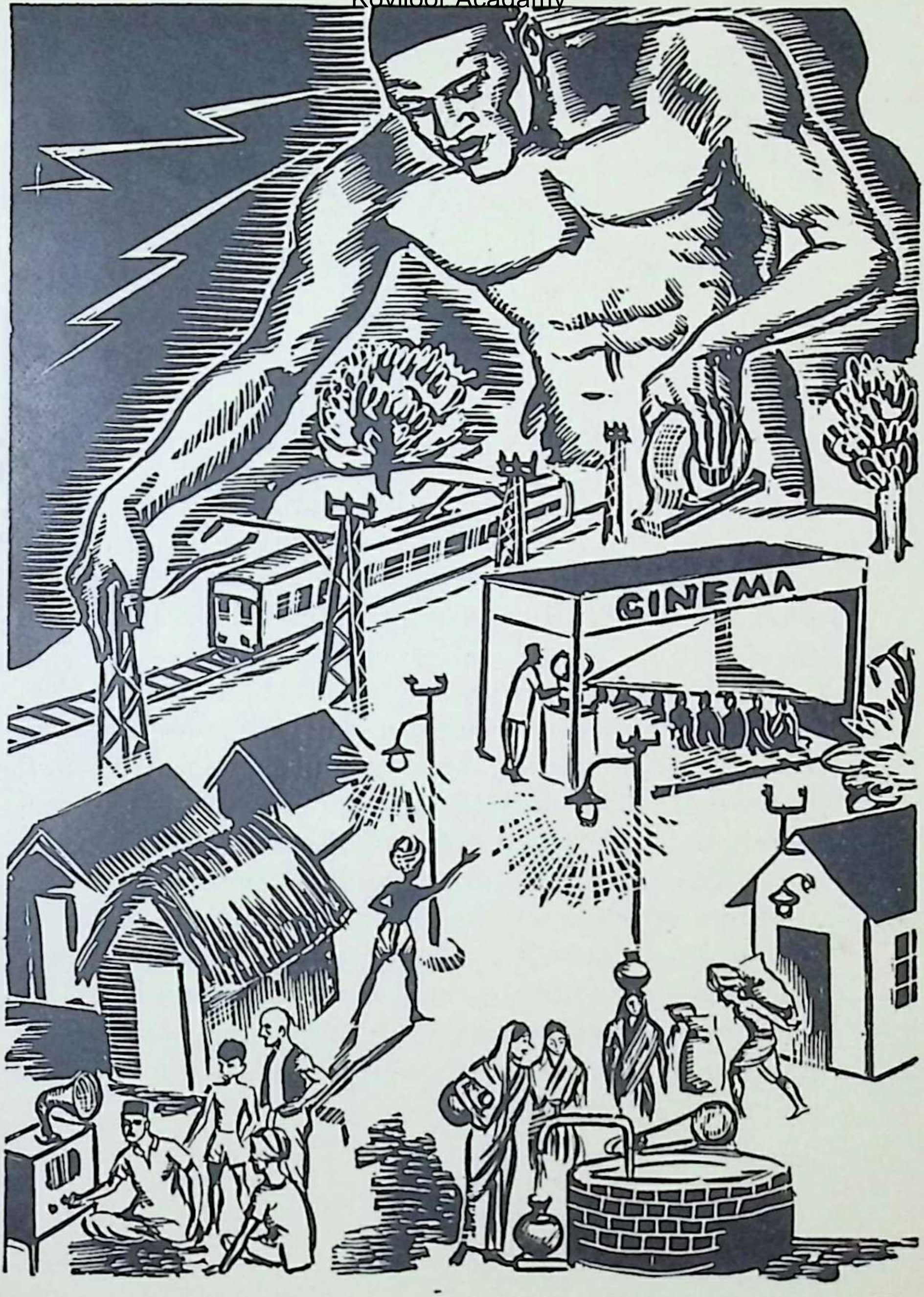


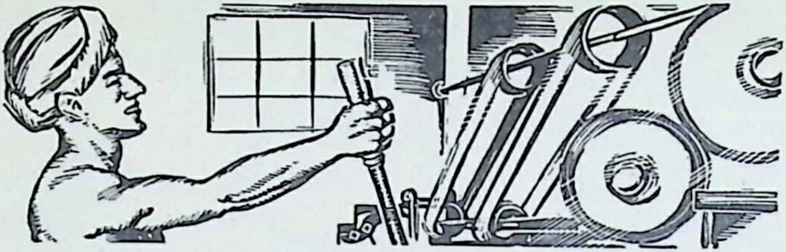
To brighten the lives of our people, we can introduce to them the radio, the gramophone, the

telephone and the cinema. And on the radio there would be many more school broadcasts; and for the village children, they would have to be, not in English, but in Hindustani and the other languages of India. And if after doing all this we still had some electricity left over, we could use it for extracting nitrogen from the air for manufacturing 'nitrolin', which is a fine chemical for fertilizing the soil.

To do all this, however, we shall need lots of electrical machinery. At present, we get it from Europe and America. Last year we paid Rs. 370 lakhs for such machinery. But we must get it cheaper, and the way to do that is to make it in our own country.

And when we have done all this and used up all our water-power and our coal reserves—by which time we shall be the richest nation in the world—there will open up before us the possibilities of using the energy of the tides of the sea. We shall also try to capture the radiant energy of the sun as it shines on us. Already, a small electric motor has been known to run by sunlight! And then, has it struck you there is all the internal heat of the earth which we may extract by digging deep holes? In Italy at Ladarella, steam comes out of the earth, and 4,000 horse-power of electricity is generated from it! And so—what can we *not* do?


CINEMA



XI

MEN OF STEEL

Do you know why the dictator of Soviet Russia is called Stalin? It isn't his own name, which is Josef Djugashvili. He has been given the name Stalin, which in Russia means Man of Steel, because he is said to be as hard as steel.

But there are other men of steel in Russia also, just as there are in other countries, thousands of them, and they are just as useful as dictators, and not such a nuisance! These are what we call Machines. They are made of steel, and they do the work that men do—only, much better and quicker.

When a country has under its land a lot of mineral ores which contain iron and other metals, and when it is rich in things like water and coal, it can provide itself easily with lots of machines. For machines are made of metal and are moved or driven by electric power.

India, unfortunately, is an exception. As we have seen, we are quite rich in metal resources, and in fact we have the world's best store of iron underground. We are also well provided with coal, and have any amount of water-power at our disposal.

All the same, as we saw in earlier chapters, the machinery in our cotton mills and electric plants is all obtained from other countries, and that is true of practically *all* the machinery we use. Altogether, we import every year machinery worth 13 or 14 crores of rupees. Why, we even have to get such simple little things as pins and screws and needles from other countries! And as for our making motor-cars, big steamers or aeroplanes, the very idea had not entered anyone's head till a year or two back, and even now we are still talking it over! They say we shall soon have a motor-car factory in Bombay, an aeroplane factory in Bangalore, and a shipyard at Vizagapatam.

What on earth, you will ask, happens to all our iron ore then? Till some forty years back, it was—as the ore containing manganese still is—shipped to other countries. But then we stopped being quite so foolish. This is how it happened. Early in this century a very wise Indian named Jamshedji Tata saw that we would never be able to make any of the things we need for ourselves unless first we learned to make the machines which can make those

articles. And we could never make the machines, he said, until first we produced our own iron and steel.

Looking round for a place to start this new industry, Tata hit upon a little village in the most jungly part of Bihar. The name of the village was Sakchi. It was, but it isn't now. Its name now is Jamshedpur. And it is no longer a village. Almost overnight, that little jungle village has become a big city with a population of 100,000. However did this happen?



'Long days ago,' as a very nice little girl friend of mine puts it, when savage tribes used to move from one place to another in search of land and food, they left the job of deciding just where to camp and start building their homes to the priest or the medicine man. This person claimed he was guided in his choice by spirits or gods.

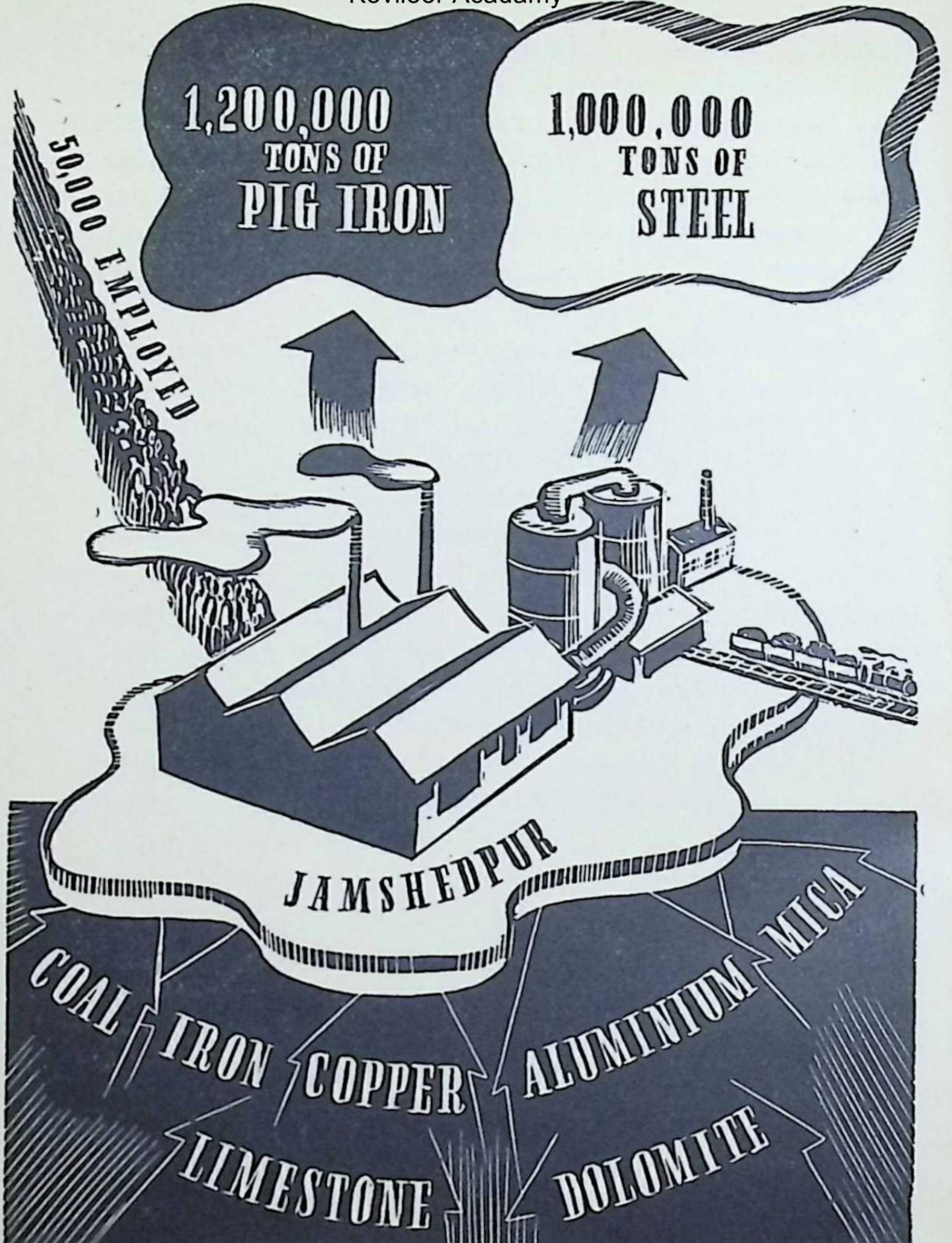
Jamshedji Tata was something of that sort of wizard. He hit on a spot that had very near it, underground, all the things a metal workshop could

possibly need—coal, iron, copper, aluminium, mica, limestone and dolomite. It had also the advantage of being placed on the railway line from Calcutta to Nagpur and to Bombay and of being near the waterways that go to Calcutta. To do the work there were the hardy tribes of Chhota Nagpur who could work so well and who needed so little to eat and wear.

That is how, under clouds of dust and the deafening crash of iron, the village of Sakchi became the Town of Steel, the Pittsburgh of India. Pittsburgh, in case you don't know it, is the biggest centre in America for making steel.

Today, the Tata works are the biggest steel factory in the British Empire and are among the twelve biggest in the world. They employ 50,000 men and produce 1,200,000 tons of pig iron and 1,000,000 tons of steel every year. First let me tell you what these things are.

Metals are not found in solid lumps in the earth, but have to be melted (or smelted) out of pieces of rock or earth called ore. Iron ore is put into furnaces which are so hot that the iron melts and flows out. The iron is then allowed to cool in moulds shaped something like a pig, which is why this rough iron is called pig iron. Steel is made by mixing iron with carbon and with other metals like manganese. This gives it greater strength, and at the same time makes it easier to hammer into different shapes.


1,200,000
TONS OF
PIG IRON
1,000,000
TONS OF
STEEL
50,000 EMPLOYED
JAMSHEDPUR
COAL
IRON
COPPER
ALUMINIUM
MICA
LIMESTONE
DOLOMITE

Not so long ago, only small articles were made of iron. It was not till 1779 that the first iron bridge was built across the river Severn in England. Things have moved a lot since then. For one thing, steel is being used more and more in place of iron, because it is stronger and lasts longer. There are dozens of kinds of steel. There is one kind of steel for bridges and another for wheels. Some kinds of steel are harder than others. Some are stainless and do not go rusty. These different varieties are made by mixing different proportions of things like manganese and carbon with iron.

It is out of steel that marvellous machines are made that do all kinds of things once the switch is turned on. There is one machine which, if fed with bars of steel at one end, turns out nuts, bolts and screws in thousands at the other end. There is another in which you put in rods of wood and get matches neatly packed in boxes. And yet another which takes in tobacco and paper and turns out cigarettes. Of course, you all know of other things made of steel like bicycles, typewriters and sewing machines.

Talking of iron and steel, we have travelled rather far from Jamshedpur. What you would like to know is whether the Tata works give us all the iron and steel we require in India.

The answer, as usual, is 'No'. As with cotton and cloth, we seem to love doing things by halves,

letting others finish them and pocket the best part of the profit. We send out more and more of the iron we produce to England and other countries and then we buy back from them steel and steel goods made from our own iron!

Now surely this is all wrong. With all the iron there is buried in India, fancy paying other countries for steel and machinery! Not all nations are so silly. The Germans extract 3 million tons of iron every year from their land. With that, and more which they get from France and Sweden, they produce 23 million tons of steel. We too extract 3 million tons of iron. But we make less than 2 million tons of steel.



It is not as if we Indians did not know how to handle metals. At Delhi there is an Iron Pillar which is 1500 years old, and at Sultanganj there is a huge statue of Buddha in bronze, which shows that centuries back people in India knew something about handling large masses of metal. At that time, Europeans

knew no better use for steel than swords and knives!

With our wonderful iron deposits there is no reason in the world why we should not produce as much steel as Germany, which is a much smaller country and which has not even a fraction of the iron we have and has to buy most of it from Sweden and France. This would mean that the works at Jamshedpur should be extended many times over.

Something is being done, but not nearly enough. Recently a new blast furnace, which can produce 1,000 tons every day, has been installed. There are now five furnaces busy at work. As I write, machinery for a new process of making what is called 'acid' steel is being set up. A new plant for generating electric power is also being set up. As a result of all these improvements, Tatas hope to produce after two years $1\frac{1}{4}$ million tons of steel, instead of 1 million per year as at present. Are you satisfied? I am not. Don't forget that Germany produces 23 million tons.

Supposing we do get, after a few years, lots more steel than we have today, what shall we do with it? We shall make machines—machines that generate electric power for us, machines that work factories and make things like cloth and shoes, machines that move (like railway engines, motor-cars, ships, aeroplanes, bicycles and tractors), and smaller things like axes, screws, hammers, bolts and pins.

The factories that make such machines are called engineering workshops.

Do we at present make any of these things? Have we an engineering industry? Hardly. The Tata works do have an agricultural department called Agrico which produces $3\frac{1}{2}$ lakhs of axes, $1\frac{1}{2}$ lakhs of hammers and 9 lakhs of *kudals* every year. They are also setting up machinery for manufacturing railway wheels and axles. And that, apart from a few tiny workshops here and there, is about all!

How and where shall we make machines out of steel? This question has been answered by some clever people who have been studying the problem. The answer they have given is that the work of making machines of all kinds should be divided between two big factories which should be set up. One of these would make big machines, boilers, railway engines and wagons. The other would make motor-cars and buses, tractors and other agricultural machinery, bicycles, aeroplanes, boats, machinery for cloth mills, steel furniture, knives and forks and other small things. Thus one workshop would do the heavy work, the other the comparatively lighter kind of work.

Where should these factories be set up? The heavy workshop, say the experts, should be in Bihar, somewhere near Jamshedpur. The reason is easily seen, isn't it? The main thing and the heaviest thing such a workshop would need is steel.



So the nearer it is to Jamshedpur, the less the expense of carrying the steel all the way to the workshop.

And where should the light workshop be? Bombay. I wonder if you can guess why? Let us see if your answer agrees with that given by the experts. Bombay has plenty of water and cheap electric power from the Tata waterworks. It has a mild climate right through the year. If any small parts for motor-cars and boats have still to be sent for from Europe or America, isn't Bombay the Gateway of India? Lastly, there is a big market for motor-cars, for boats and for machinery for cotton mills nearby, in Bombay and Ahmedabad.

Such engineering workshops have a great future and are sure to be busy and prosperous. They certainly are terribly necessary, aren't they? If we want all the things we use every day of our lives made for us in India, and made nicely and cheaply, we must have machines to make them for us. But to make these machines themselves we want other machines. These are the machines that are to be found in engineering works, where machines make machines.

XII

HINDOSTÁṆ HAMÁRÁ

'Nice sort of castles to build in the air,' I think I have overheard some of you say as you have been reading this book. Don't burn cowdung! Form co-operative farms! Don't import cloth! Turn more iron ore into steel! Electrify the country! Make all the machines that are needed! Do this, do that—and India will be a paradise of plenty. Which is all very well, but who is going to get all this done, you wonder. Yes, *who?* You certainly have caught the bull by the horns there.

My answer, in case you'd like to know, is 'YOU'. Yes, you, Young Sir, and you, Little Lady, you alone can fit together the odd pieces of the puzzle with which this book started. You alone can make a lovely picture out of them. After all, this is *your* country—or it's going to be—and if *you* don't, who d'you think will?

'But how?' you ask. Well, how do people all over the world manage their affairs, run trains, carry letters, irrigate the land and control the flow of goods in and out of their countries? They do it through their governments. The State or Government is the machine or instrument which does—or

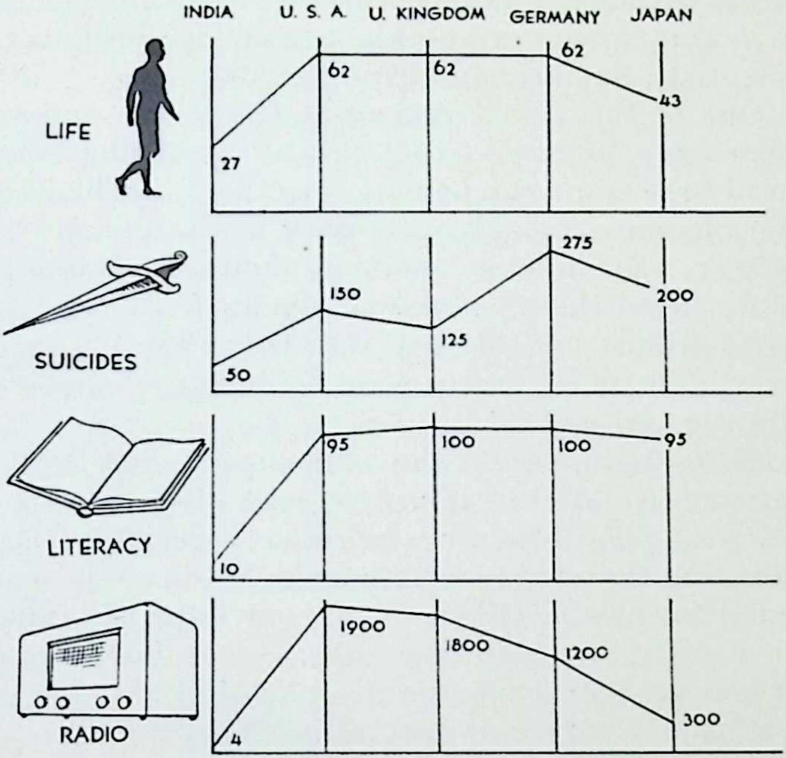
at least, *should* do, because it does not always do so—what you and I and all those who live in a country want to be done.

Unfortunately, governments are almost always slow and lazy and do only as much work as the people force them to do. If the people are slack or indifferent, so is the government. As someone has said, 'every nation gets the government it deserves'. So you see how much depends on what sort of citizens you are going to become, what you know about your country and what you understand of its problems.

This little book has tried to get you started towards such an understanding. I wonder what you have learnt from it? I'll tell you something *I've* learnt from it—that we Indians are allowing what we possess to run to waste in a very foolish way. That is because we do not try to plan our country's life. We live higgledy-piggledy, from day to day and from hand to mouth, and you've seen into what a mess we've got ourselves.

When we have a government of our own, let us hope one of the first things it will do is to start on a Plan which will stop the waste we see today and get the most out of our country and our people for their own benefit.

Such a plan takes years to prepare, though, before we can get it going. That is why something is already being done to prepare such a plan. As I



LIFE. The figures give the average length of life in years.

SUICIDES. Out of every million people, this number kill themselves.

LITERACY. Per hundred grown-ups.

RADIO. The number of sets for every 10,000 people.

write this, the National Planning Committee is meeting in Bombay, with Pandit Jawaharlal Nehru as its president. It has among its members men and women who are politicians, college professors, scientists, engineers and industrialists.

One of the many difficulties those who make a plan have to face is that not all the things that need to be done can be done together. Each of the big changes that are necessary costs money and energy, and there isn't enough of either in India to make all of them possible at the same time. You can't do this *and* that *and* the other all in the same year. The question keeps on bobbing up—shall we first do this *or* that?

Then again, those who plan have to ask themselves what kind of life, what sort of society they want to see. Planning everyone agrees to. But planning for *what*? For an India of big cities or of small towns and villages? For an India of armies of workers in giant factories or of families of artisans in cottages? For an India of big co-operative farms or of small peasant holdings?

Very difficult questions to answer, aren't they? Anyway, on page 153 is a picture of certain aspects of life in India compared with those in some highly industrialized countries. Perhaps it will help you to give your own answer.

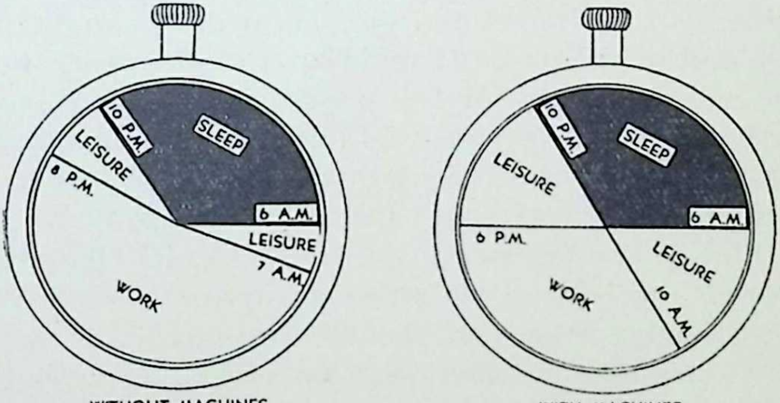
Most young people, admiring the wonderful machines produced by America and Germany and

England, would like to see huge factories and workshops set up in India also. So would big business men who hope to make big profits by making workers toil at such machines. On the other hand, there are people—and Mahatma Gandhi is one of them—who are horrified at such a prospect and want people to make what they want in their own homes.

'If you don't have a gigantic iron and steel industry, how will you have arms with which to fight a war?' asks the Friend of the Machines.

'But we don't *want* to fight any war. We should resist any invasion of our country non-violently,' replies the Back-to-the-Village Man, rather sensibly.

'If we have machines to help us, we do not have to work such long hours, and so we have more leisure to rest and enjoy the good things of life,' the Modernist continues.



WITHOUT MACHINES WITH MACHINES

'Leisure is dangerous and results in immorality. Don't forget that "Satan finds some mischief still for idle hands to do",' parries the other grimly.

'Then why not do away with the *charkha* and the plough also, so that we have to work with our bare hands twenty-four hours a day to keep alive?' laughs the Modernist.

'You see, men are not grown-up enough to handle big machines,' argues the Back-to-the-Village Man, 'and they become slaves of machines and are in danger of themselves becoming robots, men without souls, living a sort of press-the-button life. Besides, machine production leads to a lot of unemployment and allows those rich men who own the machines to cheat those who work the machines.'

'On the contrary, it is man who has mastered the machine,' replies the machine enthusiast. 'It saves him the need of doing dirty and unpleasant work with his own hands and gives him more money at the end of the day. It makes articles cheaper and makes it possible for the poor man to buy things he could not otherwise. As for unemployment and cheating, they are the result of allowing a few rich people to own machines for their own profit.'

And so the argument goes on and on. There is so much to be said on both sides that a book could be written for each of them! And, as happens in most arguments, there is a lot of truth on both sides. Mahatma Gandhi himself once said: 'What

I object to is the craze for machinery, not machinery as such . . . The spinning-wheel is itself an exquisite piece of machinery.'

What many people seem to forget is that a machine, like any other invention of science, is neither good nor wicked. It is neutral. An aeroplane can take lives by dropping bombs. It can also save lives by rushing a doctor or medicine to a distant spot where it is needed. Machines are what we make of them. So the remedy seems to be not to smash machines but to teach men to use them more wisely and more kindly.



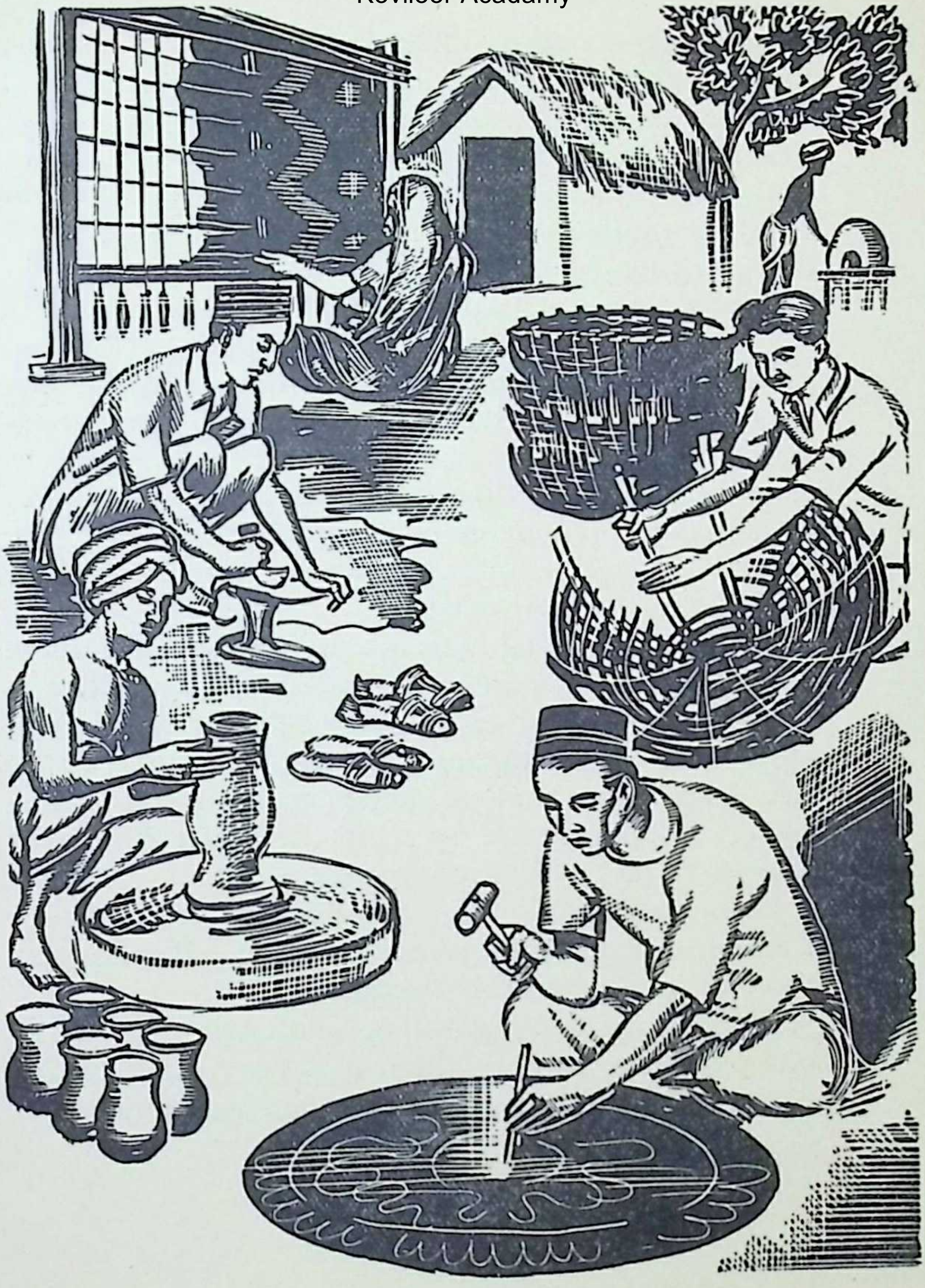
Besides, so far as India is concerned, I don't think we need get either very thrilled or very hot and bothered at the idea of this country becoming a land of factories and machines. Don't let's forget that 72 out of 100 Indians work on the land and about 90 live in villages. Less than two million work in factories. Even if we do go at breakneck speed in the direction of large-scale industry, our population is growing so fast that after ten years, even if our industries are able to absorb 20 million more men, there will still be 400 millions left on the land!

So India is bound to remain, even with the fastest progress we can imagine, an agricultural country—a country of peasants and artisans in villages rather than of workers in cities.

We want a Plan for it that will employ usefully as much of its man-power as is possible and make it produce as much as is possible. Maximum Employment + Maximum Production should, I think, be the formula.

Does that mean that problems of industry need not worry us? On the contrary, it means that in order to reduce the terrible pressure of population on the land, we must hurry up with the job of industrializing India. But it also means that since not even six per cent of the people can be absorbed in large-scale industries in cities even after ten years, our small industries must be scattered all over the countryside and have their homes in villages and small towns. In this way, those whom the land cannot support can turn their hands to other jobs without being removed from their natural surroundings. Peasants who have nothing to do in the slack season will have some handicraft to fill up their spare time, and those who are not needed on the land at all can spend all their time at cottage industries of various kinds.

There is such a great variety of village industries available. The most popular handicrafts today are the spinning of yarn on the *charkha* and the weav-



ing of cloth—cotton, silk and woollen—on the hand-loom. Lakhs of people are already at these jobs.

There are all sorts of other crafts which have been practised in India for centuries and which have managed to keep alive in spite of competition from machine-made goods. There is, for instance, work done on various metals. There is the village black-smith, of course. There are wonderfully skilful crafts-men who make things of brass, copper, silver and gold—from kitchen utensils to the finest ornaments.

Others work on ivory and marble. Yet others make carpets. There is woodwork of all kinds, from boats and furniture to little toys for children. Baskets are made from cane. Clay gives the potter work to do. The hides of animals keep the tanner and the shoemaker busy.

Seeds are pressed into oil, and from oil is made soap. Sugar-cane juice is made into *gur*. Rice is pounded by hand—and is more nutritious than that which goes through the mill. Fruit can be preserved. Ink can be made by hand and so can paper. Paper made by hand in Nepal has been known to last a thousand years.

Cows and buffaloes, goats and hens are there for those who want to do dairy-farming. Bee-keeping too can be a profitable occupation.

If there are all these village industries, why don't our peasants turn to them in large numbers and why are the artisans in such a bad way now?

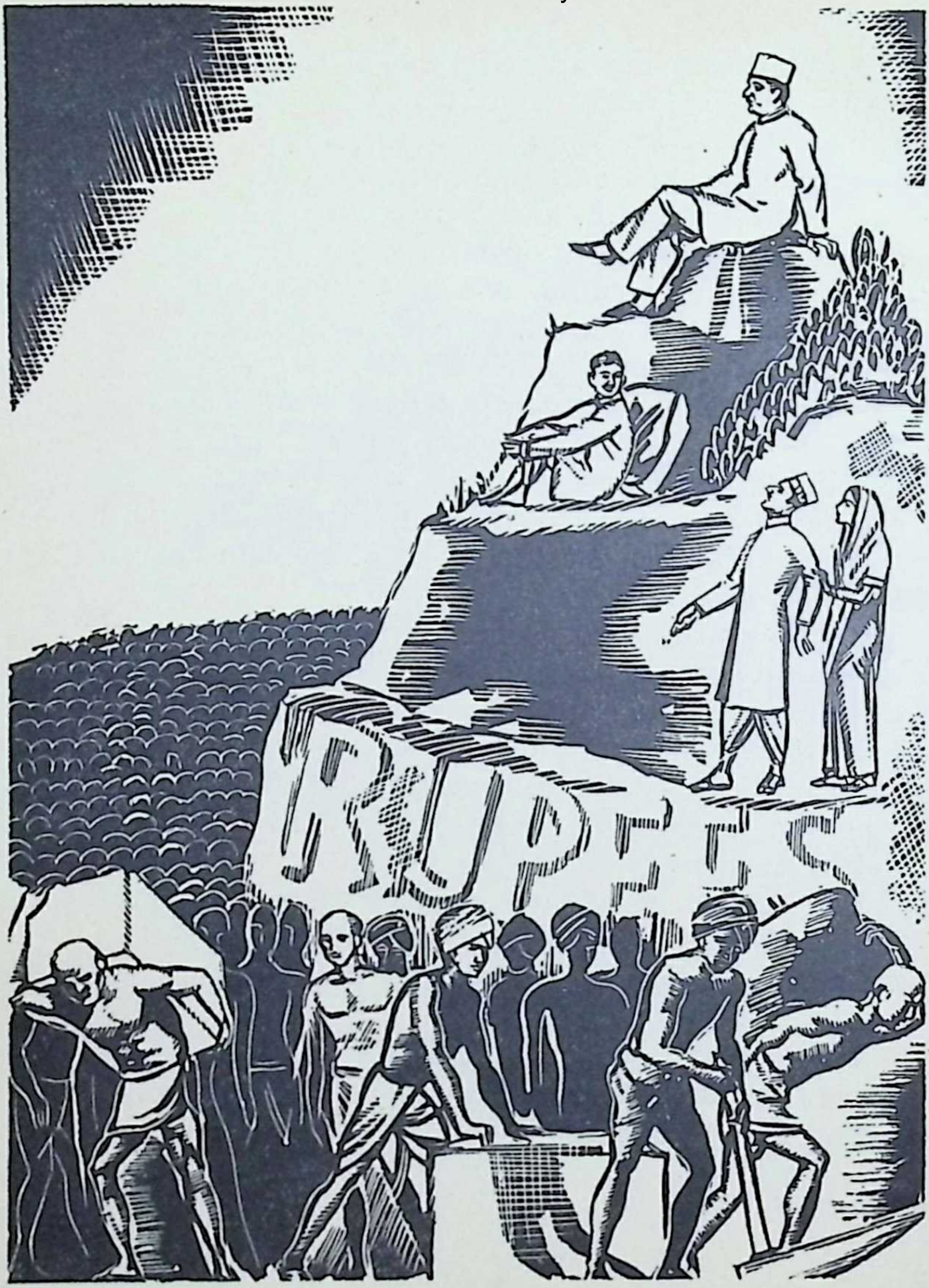
The answer is that they lack three things—capital, skill, and a market. Most people in an Indian village are too poor to be able to buy raw materials or even simple hand tools. The level of their skill is very low and their taste, though naturally good, is very out-of-date. And what they do make they do not know how or where to sell.

If these small industries are to be made prosperous and popular, a lot of help will have to be given to them to set them properly on their feet. The Government will have, either directly or through co-operative societies, to give loans to the cottage industries or, better still, supply them with raw materials to get them out of the clutches of the money-lenders.

The next thing to do is to open technical institutes and schools where new instruments and tools, new labour-saving appliances and new designs can be invented and training given to selected craftsmen. These could then go round the villages teaching people how to use these tools and make better articles.

The marketing of these articles should be organized by a staff of marketing officers or by co-operative societies, so that the craftsmen may get a fair price for their wares.

It is in these ways that small industries have spread fast and become so popular in countries like Japan and Switzerland.


RUPEES

Even so, while in some cases things can be made very cheaply by hand, in others the price will not be as low as that of the same things made in factories. So the Government would have to restrict or even stop the making of many small articles in big factories.

At the same time, village industries will want the big plants in the cities to supply them with certain necessary things. They will need good tools and small machines from big engineering workshops, dyes and chemicals from big chemical laboratories. They will also want cheap and plentiful electric current from giant hydro-electric plants to make their tools move much faster than their own hands could ever make them do. So we see how the village and the city are tied up together, and how one cannot live without the other.

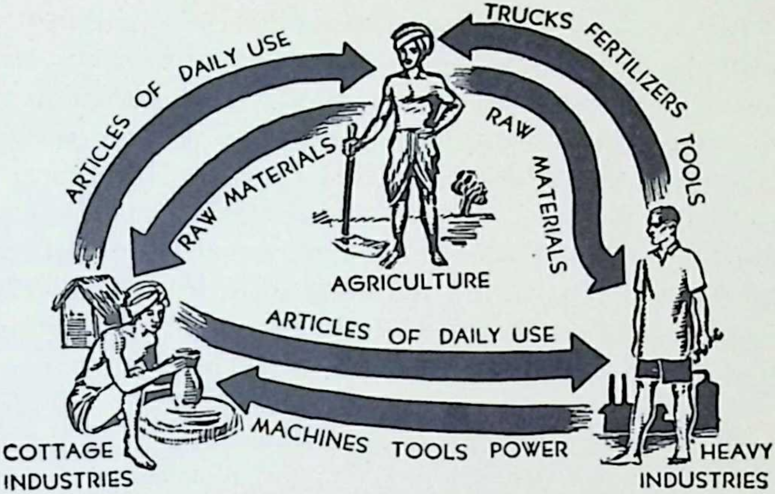
Does that mean that a few Big Business men who own these big workshops and factories are to control the lives of our people and make big profits at their expense? Look at this picture. It shows you how today a handful of persons in India make a lot of money while most people earn so very little. You see a few rich people high up on the mountain and the rest low down in the wide, wide plain. It opens our eyes to a great danger. How are we to make sure that the people who own big workshops do not use their key positions to send themselves higher up the mountain?

The answer is quite simple. These big factories and plants should have no owners. Then who will run them? We shall, all of us, through our own Government. After all, there is nothing very strange in that, you know. We don't give contracts to business men to carry our letters for us, do we? Our own Post Office does that for us very quickly and efficiently. The water supply of our cities is organized by our Municipalities themselves on our behalf. The railways in India are now run by the Railway Board of the Government. Is there any reason then why the supply of electricity and the manufacture of iron and steel and machines and chemicals should be left to a few business men and not be undertaken by the State?

None whatsoever. Which is why many people think that Key Industries, that is those on which other industries and the life of the people depend, ought to be made the common property of the nation and to be run for its benefit.

So, in our picture of India Tomorrow we have big industries owned by all the people of India put together, through the State, and small industries each owned by one man or by a group organized perhaps in a co-operative society. Alongside both, there is, of course, India's Biggest Industry—the cultivation of the land.

Here you see how each of these three partners in



the economic life of the country would help one another and be fed by one another.

What we shall have to do is to try and strike a balance between a mainly agricultural country such as India is today—'hewers of wood and drawers of water' for more advanced countries—and the sort of top-heavy industrial country that England has become. We must have many more industries, but they must be spread out in cottages and in little workshops scattered all over the country. That way, we can avoid the horrors of machinery without throwing away its advantages.

Like people in other countries we do want more of the good things to eat, to wear and to use. We want them, however, not because they are the finest

things in life, but because they help men and women and children to get the best out of life and to give the best that is in them. Round about us is the great expanse of India and within each one of us too there is a little bit of Our India. We want to cultivate what is *round* us so that we can cultivate all that is *in* us. We are proud of our country and we want it to be just a little proud of us.

And so let's all sing together a song one of our great poets, Mohammad Iqbal, has given us:

Sáré jaháṇ sé achhá Hindostáṇ hamárá,
Ham bulbuléṇ haiṇ iskí, yih gulistáṇ hamárá.
Parbat woh sab sé uṇchá hamsáya ásmán ká,
Woh santari hamárá, woh pásbáṇ hamárá.
Godí méṇ kheltí haiṇ iskí hazároṇ nadiáṇ
Gulshan hai jiské dam sé, rashké jaháṇ hamárá.
Mazhab nahíṇ sikhátá ápas méṇ bair rakhná,
Hindi haiṇ ham, watan hai Hindostáṇ hamárá.

In case you don't understand these lines (though you certainly should!) this is what they mean:

The finest country in the world is our India,
We are its nightingales, it is our rose-garden;
The highest mountain-range, the neighbour of the sky,
Is our sentry and our protector;
In its lap play thousands of rivers
Which make of it a garden that is the envy of the world;
Religion does not teach us to bear enmity towards one another,
We are Indians and our country is India.